

STATEMENT OF QUALIFICATIONS

SDMS Document



113607

LCP Chemicals Inc. Superfund Site Linden, Union County, New Jersey

Prepared for:

**ISP Environmental Services, Inc.
1361 Alps Road
Linden, New Jersey**

Prepared by:

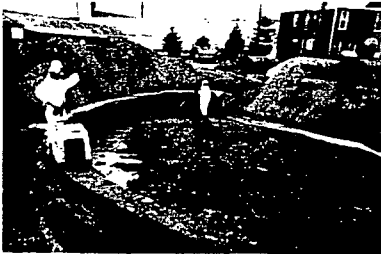
URS Greiner Woodward Clyde

June 1999

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1.0 Asset Management Approach to Remediation Maximizes Value



As the waste remediation business has evolved, URS Greiner Woodward Clyde has responded to our client's needs by offering services that provide several types of value. We approach a site that requires remediation as an asset to be proactively managed to maximize its value. To accomplish this objective, we apply several tools, including:

- end use/reuse planning
- risk-based cleanups
- insurance recovery
- aggressive regulatory strategies
- pro-active community relations
- passive cleanups with institutional controls where applicable
- financial risk assessment

Our approach maintains a continuous focus on keeping costs as low as possible and completing the work as quickly as possible. We feel that the team approach to remediating sites process most beneficial-that is, we assemble a team with expertise in all of the areas needed to accomplish the project objectives. We also believe that a turnkey approach is most cost-effective: one team, best results.

The next section presents our capabilities in each of the key remediation activities:

- site assessments/investigations
- feasibility studies
- construction management
- remedial construction

2.0 We Provide a Broad Array of Remediation Services



URS Greiner Woodward Clyde self-performs most of the services required to successfully remediate a site. We will not hesitate, however, to augment our staff with specialized expertise that may help us optimize a remedial solution for a particular site - the best solution is our objective.

The following paragraphs present a brief overview of our capabilities in remediation:

Site Assessment/Investigation. URS Greiner Woodward Clyde has performed thousands of site assessments over the past 15 years. This experience has taught us a great deal about how certain types of sites should be investigated, and what tools are most useful to get the job done at the lowest cost.

For example, we do not collect any data that are not required to accomplish the next tasks. We look at what the ultimate objective is, and plan/scope the investigation accordingly. We use a formal process, called *data quality objectives evaluation*, to develop the sampling scheme. This process has saved our clients hundreds of thousands of dollars in field data gathering costs.

The conditions at every site are uncertain. We employ various statistical and probabilistic tools to extract all of the information possible from a data set. This enables us to carry out site evaluations with the minimum field effort.

URS Greiner Woodward Clyde's in-house *National Laboratory Audit Program* is designed to ensure that all analytical work is conducted with the highest quality. We audit every laboratory before we trust them with your data.

Data management is a critical activity when data sets are large or complex. We develop a data management plan for documenting, validating, and storing field data. We regularly use advanced data management software, such as Site Manager Pro™, which provides "point and check" data management (URS Greiner Woodward Clyde developed this software). We also use various data visualization software, such as Site Planner™ and EVS to produce easy-to-understand graphical portrayals of contaminant plumes.

URS Greiner Woodward Clyde's Practice Personnel are knowledgeable of current remediation technologies.

Feasibility Studies. URS Greiner Woodward Clyde completes about 50 feasibility studies each year. Our experience has shown that the key to feasibility studies is to evaluate the remedial alternatives against risk-based remedial action goals. It is also important to consider the residual risk after implementation of the remedial action, and compare this risk with the remedial cost. The goal is to achieve a low residual risk at the lowest cost.

Remedial Design. URS Greiner Woodward Clyde has an exceptional track record in remedial design, having applied many innovative technologies to remedial projects since 1984. For example, we designed one of the first applications of vapor extraction for contaminated soils in 1984. In 1992, URS Greiner Woodward Clyde designed the first passive in situ bioremediation system operating for diesel fuel contamination.

Most of our larger offices, such as Wayne, NJ and Blue Bell, PA, have conceptual design capabilities in-house. Our detailed design is accomplished in several design centers, one of which is located in our Wilmington, DE office.

Our Central Design Library saves money and time for remediation projects.

Our design work is by URS Greiner Woodward Clyde's **Central Design Library**, a repository of CADD details, master project specifications, and archived drawings. It is located on a server in Denver, but accessible to all URS Greiner Woodward Clyde offices through our wide-area network. The CDL provides many benefits to our clients, including:

- more cost-effective design services
- increased design quality and consistent service delivery over multiple locations
- peer reviewed designs
- a method to share innovative design solutions world-wide
- expedited schedules for both conceptual and detailed design efforts



Construction Management. URS Greiner Woodward Clyde has extensive construction management experience which includes about \$60 million worth of work annually. Our CM work is founded on excellent project management skills and tools. We train every Project Manager using our in-house trainers and professional.

Remediation Construction. Our construction subsidiary, Geo-Con, performs work as a general contractor, specialty contractor, or in a design-build mode for site remediation projects. *Geo-Con is particularly strong in slurry wall construction, containment capping, synthetic liner systems and in-situ soil mixing projects.* This year, Geo-Con will complete over \$50 million in construction contracts.

Currently, Geo-Con/URS Greiner Woodward Clyde is engaged on a number of projects with national laboratories to develop new, cost-effective remedial construction technologies, including barrier walls and jet grouting.

3.0 Overview URS Greiner Woodward Clyde

URSGWC, a multidisciplinary environmental sciences, architectural, engineering and construction management organization founded over 90 years ago, is nationally recognized for providing high quality and reliable consulting services to both public agencies and private businesses. The firm provides professional services in environmental sciences, construction management, project management, engineering studies, condition assessment and design. In the April 1998 publication of *Engineering News Record* ranking design firms that provide engineering/architectural design and construction management services, URSGWC's position is impressive:

- 1st largest pure design firm in the nation (ENR April 1999)
- 2nd largest transportation engineering firm in the nation (ENR April 1999)
- 9th largest hazardous waste firm in the nation (ENR April, 1999).

Through 150 office locations worldwide, URSGWC employs a full-time staff of more than 6,000 science and engineering professionals with combined expertise in virtually every technical discipline. We bring a proven record of success in delivering on-time and cost competitive environmental services on major projects. Locally, the firm possesses extensive skilled personnel resources and proven expertise.

Table 4-1 is a snapshot of our experience in remedial investigations, design and construction in the northeast. More detailed project descriptions are provided in Appendix A.

3.1 Qualifications Of The Project Team

The URSGWC project organization chart is presented on the next page. This team was selected to provide ISP with the most qualified individuals in the region for this important project. Personnel have been selected for each of the potential disciplines that are anticipated to be associated with the scope of services as presented in the Consent Order.

This team is supported by over 500 technical and regulatory professionals in our New York Area offices, covering the full range of environmental and engineering services needed for the successful completion of all tasks on this project.

George Leahy, P.E., who will serve as Project Director, has over twenty years of environmental technical and management experience in all of the areas required for this project. As a Vice President and officer of the firm, he will have full authority to control the dedication of the proposed staff to this important project.

The Project Manager, Thomas Pisciotta, is a Principal Environmental Manager with over fifteen years of experience in managing multi-disciplined projects for major clients. Mr. Pisciotta will serve as the primary contact for ISP and will be fully responsible for all project staffing, deliverables, schedule and budget control.

The resumes these and the other key personnel identified are included in Appendix B.

PROJECT ORGANIZATION CHART

ISP Environmental Services, Inc.

Project Director

George Leahy, P.E.

Health and Safety Officer

Robert Gaibrois

Project Manager

Thomas Pisciotta, P.G.

Remedial Investigation Leader

Peter Naumoff, P.G.

Groundwater Assessments

Gordon Jamieson

Ecological Assessments

Ceil Mancini

Treatability Test Leader

Robert Cebula

Laboratory Subcontractor

Accutest, Inc.

Feasibility Study Leader

Brendan Coffey, P.E.

New Jersey Area Resources

Archaeologists (11)
Asbestos Specialists (8)
CADD Operators (33)
Chemical Engineers (14)
Chemists (8)
CIH/Health and Safety (9)

Civil Engineers (55)
Construction Inspectors (40)
Construction Managers (95)
Corrosion Engineers (6)
Electrical Engineers (14)
Environmental Scientists (22)

Estimators (10)
Field Technicians (36)
Geologists (21)
Hazardous Waste Specialists (17)
Health Risk Assessors/Toxicologists (7)
Hydrogeologists (15)

Hydrologists (10)
Landscape Architects (2)
Mechanical Engineers (22)
Sanitary/Env. Engineers (28)
Soils/Geotechnical Engineers (22)
Structural Engineers (27)

TABLE 4-1
Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Investigation	RCRA Facility	Confidential	<p>URS Greiner Woodward Clyde was retained by a national chemical company to perform a Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) at their former manufacturing facility. URS Greiner Woodward Clyde performed a Preliminary RCRA Facility Investigation (Preliminary Investigation) at the facility. The investigation had two objectives: determine if the number of AOCs and SWMUs could be reduced, and begin collecting data to characterize the facility's environment. The Administrative Order required that the RFI be performed in two phases: Phase I - to characterize the nature of contaminants, and Phase II - to delineate the extent of contamination. The Order required these investigations to be completed within strict deadlines. URS Greiner Woodward Clyde successfully negotiated extending the Phase I schedule by splitting the investigation into two parts (Phase IA and Phase IB). The extended schedule allowed URS Greiner Woodward Clyde to better characterize the site by producing a more detailed conceptual site model that allowed us to optimize future work. URS Greiner Woodward Clyde reduced sampling at selected SWMUs and POCs which reduced costs significantly.</p> <p>Phase IA. The objective of this phase was to characterize the site's physical environment and to develop a working conceptual site model. The investigation consisted of four studies: geological, geophysical, hydrogeological, and a hydrological. The results of these investigations were integrated into the model of the site's physical environment.</p> <p>Phase IB: The objective of this phase of work was to determine the nature of contaminants on the site. This phase of work was developed to minimize the number of chemical samples needed to be collected based on the conceptual model developed in Phase IA. Two rounds of sampling were performed and additional physical characterization studies were conducted to refine the conceptual model.</p> <p>Phase II: The objective of this phase of work was to delineate the extent of contamination, evaluate the fate and transport of contaminants, perform a human health and ecological risk assessment, collect additional data needed for the CMS, and to develop Media Protection Standards. The RFI Report (detailing all work performed to</p>

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TABLE 4-1 (continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Investigation	Mountaintop Facility, PA	Foster Wheeler Energy Corp.	<p>date) was submitted to USEPA approximately 3 months early.</p> <p>An environmental site assessment was conducted at the Mountaintop facility due to a potential real estate transaction. Phase I results indicated both the groundwater and the vadose soils were contaminated by trichloroethylene (TCE).</p> <p>Phase II included installation of additional monitoring wells, delineation of soil contamination, permeability (slug) tests in the source area vicinity, collection of rock core from a 500-ft hole, geophysical logging of deep monitoring wells, collection of water level data over a two-year period, and field GC analysis of soil samples.</p> <p>A Consent Order and Agreement under the conditions of Section 106 CERCLA were jointly negotiated with USEPA Region III and Pennsylvania Dept. of Environmental Protection (PADER) in 1989. The Order required a work plan including a final site investigation plan (SIP), a detailed QAPP, and a project management plan. This additional investigation was to focus on the remediation of the TCE-contaminated aquifer, but also included the seven additional areas. Several short- and long-term pumping tests were performed to evaluate aquifer characteristics and estimate the zone of capture for groundwater remediation. Computerized modeling was used to analyze test data and locate wells. A geological reconnaissance and fracture trace analysis of the formation was detailed in the investigation.</p>
Remedial Investigation	Paterson Gas Plant, Paterson, NJ	Public Service Electric & Gas Co.	<p>URS Greiner Woodward Clyde was to determine the extent of contamination at the former Paterson Gas Plant site.</p> <p>URS Greiner Woodward Clyde developed and implemented an extensive remedial investigation (RI) for this 13-acre site and adjacent off-site areas. URS Greiner Woodward Clyde conducted site investigation activities including: excavating test trenches; drilling soil borings; installing overburden, shallow bedrock and deep bedrock monitoring wells; collecting soil and groundwater samples for chemical analyses; determining groundwater flow direction in the overburden and bedrock aquifers; performing permeability testing of the overburden aquifer; and collecting surface water and sediment samples from the adjacent river for chemical analyses. Computer applications included aquifer test analysis, modeling, and data presentation using Site Planner.</p>

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TABLE 4-1 (Continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Investigation	Pelham Bay Landfill, NYC	NYC Department of Environmental Protection	<p>URS Greiner Woodward Clyde performed the RI program on the 81 acre landfill, which consisted of soil and rock borings, test pits, the installation of monitoring wells and piezometers, on- and off-site air sampling, and sediment/ecological sampling in the nearby water ways. Physical and analytical laboratory tests were performed on the various media sampled during the study. The data acquired was managed using a sophisticated computer data system (ACS) and plotted/contoured using CAD drawings and software developed originally for the mining industry.</p> <p>As part of a multi disciplined RI/FS program, URS Greiner Woodward Clyde assessed the groundwater flow conditions, determined the nature and extent of groundwater contamination, and the fate of contaminants in the fill, overburden, and bedrock groundwater system, and developed a conceptual remedial measure for groundwater.</p> <p>The results of the assessments were used in the fate and transport, and health and ecological risk assessments.</p> <p>As part of a community health impact assessment, URS Greiner Woodward Clyde monitored air contaminants at 16 locations around the landfill.</p> <p>URS Greiner Woodward Clyde also conducted an indoor air monitoring program of five homes of area residents to evaluate whether soil gas emissions from the landfill were entering the homes in levels that could pose a potential health risk.</p>

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TABLE 4-1 (continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Design	Groundwater Capture and Treatment System, Rhode Island	Confidential	<p>URS Greiner Woodward Clyde was retained by a national chemical company to design a groundwater capture system, groundwater pre-treatment system and soil vapor extraction (SVE) system at a former chemical manufacturing facility located in Rhode Island. URS Greiner Woodward Clyde was also retained to conduct two interim remedial measures (IRM) at the facility. The IRM's called for the removal of contaminated soil from the former production area and a former waste disposal area and contaminated sediments from an old coffer dam area in the river that was adjacent to the facility.</p> <p>The conceptual remedial design included a groundwater capture system (consisting of two to four recovery wells), a groundwater pre-treatment system and a SVE system. Captured groundwater would be pumped via a forcemain to the groundwater pre-treatment system. The groundwater pretreatment system consisted of equalization, activated carbon adsorption and pH adjustment. Vapors from the SVE system were treated on-site by a thermal oxidizer. Groundwater collected from the SVE system was also pumped to the groundwater pre-treatment system for treatment. Groundwater from the pre-treatment system was discharged to the local POTW for final disposal.</p> <p>During the implementation phase, URS Greiner Woodward Clyde developed the bid documents, provided bid evaluation assistance, reviewed the shop drawings, and provided resident engineering and start-up assistance. Construction of the groundwater capture and groundwater pre-treatment systems was fast-tracked to allow the Client to meet the mandated startup date. The construction and startup schedules were met.</p>

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TABLE 4-1 (Continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Design and Construction Management	Mountaintop Facility, PA	Foster Wheeler Energy Corporation	<p>Remedial design for the primary and secondary areas was completed by URS Greiner Woodward Clyde within two weeks because of a deadline for release of the property to a new owner. For the groundwater cleanup, it was important to the client to have a system that would not require a full time operator. This design effort required six months. URS Greiner Woodward Clyde designed a system that would be fail safe and require little maintenance and on-site control. The basis of the system is a set of redundant shallow tray air strippers and recovery wells (capable of handling 300 gallons per minute) linked to an automated data acquisition and control system (ADAS). The groundwater recovery wells were installed at three locations at the site for interim remedial measures. The final design and bid package for the groundwater treatment system was completed by URS Greiner Woodward Clyde and approved by USEPA.</p> <p>URS Greiner Woodward Clyde directed the primary and secondary area cleanup which included soil excavation, waste disposal, and building decommissioning and interior/exterior washing. The shallow tray air stripping remedial system was installed by A. Pickett Construction with onsite QA and inspection by URS Greiner Woodward Clyde. URS Greiner Woodward Clyde provided scheduling, construction inspection, office engineering support (as designer), change order and payment review and recommendations, and commissioning. URS Greiner Woodward Clyde installed an ADAS control/logging system and the associated instrumentation..</p>

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TABLE 4-1 (Continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Remedial Design and Construction Management	Paterson Gas Plant, Paterson, NJ	Public Service Electric and Gas Co.	<p>URS Greiner Woodward Clyde developed and implement several Interim Remedial Measures at the site. This included preparation of technical specifications, detailed design drawings, and health and safety plans for construction of an Interim Containment System (ICS) along the adjacent Passaic River to contain and collect the discharge of hydrocarbon product from the site. URS Greiner Woodward Clyde also prepared technical specifications, detailed design drawings, bid documents, and health and safety plans for removal of nine underground storage tanks at the site as well as the construction and operation of a pilot product recovery system.</p> <p>URS Greiner Woodward Clyde provided construction management and health and safety oversight during construction of the ICS (including obtaining all necessary federal, state and local permits) and removal of the nine USTs at the site. URS Greiner Woodward Clyde also provided management oversight and health and safety oversight during excavation and transport of 30,000 tons of contaminated soil from the site and supervised the backfilling of the excavation.</p>
Remedial Design, Feasibility Study	Pelham Bay Landfill, NYC	NYC Department of Environmental Protection	<p>URS Greiner Woodward Clyde performed a comprehensive feasibility study (FS) to develop, evaluate, and recommend a long-term, cost effective, environmentally sound, comprehensive remedial alternative for the Pelham Bay Landfill.</p> <p>After evaluation of the remedial objectives, four alternatives were considered feasible based on an initial selection process.</p> <p>The selected remedy consisted of a 30 inch thick soil cap with a 60 mil thick geo-membrane, an active gas collection system, upgrade of an existing IRM leachate pumping system to discharge leachate into a POTW, and installation of a cutoff wall to limit leachate and methane gas from reaching the nearby Pelham Bay Park.</p> <p>URS Greiner Woodward Clyde designed a cutoff wall, collector drains, a landfill cap, and leachate, gas, and stormwater collection systems.</p> <p>During the design phase, URS Greiner Woodward Clyde evaluated the possibility of regrading the landfill refuse (to minimize the import of material to the site) in order to reach required grades for the construction of the cap. This technique achieved savings of about \$35 million for the closure costs original closure costs in the FS report were about \$50 million.</p> <p>As part of Package C, URS Greiner Woodward Clyde prepared detailed plans &</p>

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TABLE 4-1 (continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
			specifications for an off-site force main to transport the leachate from the landfill to a POTW on Burr Avenue.
Remedial Construction	In-Situ Thermal Desorption for Waste Oil Saturated Soils, Glens Falls, NY	General Electric Company	<p>URS Greiner Woodward Clyde performed construction oversight for the remediation of an inactive hazardous waste site. Waste oil, reported containing PCBs, had been applied at a former drag strip for dust control. URS Greiner Woodward Clyde has completed a remedial investigation, feasibility study, treatability studies, and supported the remedial design and prototype development of an innovative remedial technology.</p> <p>URS Greiner Woodward Clyde managed the field treatability study and prototype design study for the in-situ thermal desorption process. Duties included remedial design review, equipment procurement, field engineering, and operation of the remedial system during research and development (R&D) tests and pilot tests to determine component reliability and process optimization.</p> <p>URS Greiner Woodward Clyde managed the construction and R&D testing for the Indirect Thermal Desorption system, the second alternative specified by the ROD. Demonstration tests of both innovative remedial technologies were conducted under the guidance of USEPA and supervision of NYSDEC.</p>
Feasibility Study	Mountaintop Facility, PA	Foster Wheeler Energy Corp.	<p>Background conditions were summarized. The alternatives analysis was performed to evaluate the best possible options for cleanup of the building and an interim remedial measure for ground water. Remedial measures selected for building closure and cleanup prior to sale included excavation of soil; pumping of waste oil; disposal of residual waste materials; cleanout of a wastewater treatment system; confirmatory test borings; and soil, water, and sludge sample collection and analyses. Alternatives for groundwater included no action, capture for all water above background levels of contaminants, capture of source water (≥ 1 ppm volatile organics (VOs)) carbon adsorption, column air strippers, shallow-tray strippers, source removal (vapor extraction and excavation), and chemical oxidation. It was determined that appropriate risk reduction was achieved by capture of groundwater source (≥ 1 ppm VOs). Cost analyses of three scenarios were evaluated. A recovery test well and near-field modeling helped develop design criteria for the design of the pump and treat system.</p> <p>The recommended alternative consisted of capture of all groundwater per 1 ppm VOs.</p>

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TABLE 4-1 (Continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Feasibility Study	Paterson Gas Plant, Paterson, NJ	Public Service Electric and Gas Co.	<p>URS Greiner Woodward Clyde developed risk-based remedial objectives for the site based on an evaluation of all potential exposure pathways contributing to risk. The analysis included extensive evaluations of the properties of MGP residuals including LNAPL, DNAPL, and tarry residues found in soil and groundwater at the site, including laboratory testing of physical/chemical properties of the non-aqueous phases. Migration of DNAPL and tar residues in fractured bedrock underlying the site was studied and modeled. The risk-assessment determined remediation needs for current and expected future industrial use of the site, supporting use of the on-site containment and institutional controls to eliminate exposure pathways contributing to risk.</p> <p>URS Greiner Woodward Clyde then assisted PSE&G in a review of remediation technologies and the development of a strategy for the remediation of manufactured gas plant residuals at the site. The current strategy includes removal of on-site contaminant sources, capping remaining residual soil contamination, and establishing institutional controls to ensure no exposure to contaminants. The institutional controls include containment and control of the overburden aquifer groundwater and no further action with regard to the underlying DNAPL contaminated fractured bedrock. The containment and control of the overburden aquifer will be achieved through the combination of a barrier wall between the adjacent river and the site and a groundwater extraction/treatment system inside the barrier wall to control groundwater.</p>

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TABLE 4-1 (continued)

Selected Hazardous Waste Management Experience

Service Type	Project Name	Client	Service Description
Feasibility Study	Haledon Pigment Manufacturing Facility, NJ	Bayer	<p>An assessment of an organic pigment manufacturing facility in Haledon, New Jersey indicated that the groundwater and soils were contaminated and required cleanup and remediation. Remedial investigations were conducted by another corporation. In 1993, URS Greiner Woodward Clyde was retained to evaluate remedial alternatives for the soil and groundwater contamination and to recommend a remedial alternative for the remediation of the soil and groundwater.</p> <p>Thermal enhanced SVE was pilot tested to determine its viability as a remedial alternative for soil. It was found that thermal enhanced SVE was not cost effective at this site. UV oxidation was evaluated for the groundwater treatment and initially recommended but was later rejected due to high O&M costs for this technology.</p> <p>The remedial alternatives were developed based on remediating the areas of concern. The remedial alternatives were evaluated based on the cleanup goals for the areas of concern, the protection of human health and the environment by eliminating or controlling the sources of contamination and minimizing the potential for exposure, media specific goals that are consistent with applicable or relevant and appropriate requirements (ARARs), the prevention of future contamination and the permanent reduction in toxicity and cost effectiveness. Twelve alternatives were investigated for remediating the areas of concern including capping the contaminated soils and sludges, stabilization of the contaminated soils and sludges, securing the contaminated areas, treatment of the groundwater and containment of the groundwater. Four site-wide alternatives were investigated including limited/institutional action, vapor extraction for the soils with groundwater treatment, in-situ stabilization with groundwater treatment and on-site secured containment with groundwater treatment.</p> <p>The alternative recommended by URS Greiner Woodward Clyde was vapor extraction of the soil with groundwater treatment. This alternative was the most cost effective remedy for the site. This alternative met the cleanup goals for the site, reduced the toxicity, mobility and volume of contaminants, provided a long-term remedy for the Site and implemented source reduction technologies.</p>

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APPENDIX A
PROJECT DESCRIPTIONS

CALDWELL TRUCKING COMPANY SITE

SCOPE OF SERVICES

- Superfund Remedial Action
- Off-Site Groundwater Remediation

CLIENT

Coffey & Sullivan

CLIENT CONTACT

Greg Coffey
973-539-4500

LOCATION

Fairfield, New Jersey

DURATION

1992-1993

URS Greiner Woodward Clyde (URSGWC) is conducting remediation of an off-site groundwater plume near the Caldwell Trucking Company site in Fairfield Township, New Jersey. The investigation is authorized under the USCOE, Kansas City District and USEPA Region II Interagency Agreement No. DW96934384-0, and is in compliance with the 28 September 1989 Record of Decision (ROD) remedial alternative selection. The basis of the ROD includes remediation of the off-site groundwater plume, remediation of a seep and tributary to a brook, and the sealing of wells located within the plume.

URSGWC developed a Pre-Design Work Plan to investigate: 1) historical groundwater data to delineate other sources which may be impacting the Caldwell contaminated groundwater plume; 2) further delineation of the contaminated plume within four geologic zones in the area; 3) groundwater aquifer testing; 4) leachability testing; 5) groundwater modeling to include sources and geology of the area; 6) wetlands delineation; 7) preparation of a water budget; 8) groundwater level measurements; 9) surface water sampling of the Passaic River and Deepavaal Brook; and, 10) developing a conceptual design for groundwater pump and treat by identifying the number and location of groundwater extraction wells.

The draft conceptual plans for groundwater remediation included pumping well installation details, well locations and depths, verifying site conditions with rights-of-way, access, etc. The conceptual plans included a conceptual cost estimate for the remediation.

Project Profile

DELAWARE SAND AND GRAVEL SUPERFUND SITE

SCOPE OF SERVICES

- Remedial design
- Field Investigation Program
- Subsurface Evaluations

CLIENT

U.S. Army Corps of Engineers

CLIENT CONTACT

Steven Rowe
402-221-7676

LOCATION

New Castle, Delaware

DURATION

1989-1992

URS Greiner Woodward Clyde (URSGWC) was tasked with developing remedial designs for this Superfund site located in New Castle, Delaware. The project was being carried out in phases. Under the first phase, URSGWC developed pre-design investigation work plan documents which included Field Sampling Plan (FSP), Site Health and Emergency Response Plan (SHERP), Quality Control Plan (QCP), Laboratory Quality Management Plan (LQMP), Thermal Destruction Treatability Study Plan, and an outline for the Pre-design Investigation Report. The ROD for this site specified thermal destruction of soil contaminants and drums present on site. The FS put the remediation cost in excess of (1989) \$45 million.

The second phase, completed in August 1991, involved the comprehensive intrusive field investigation and testing program described and specified by URSGWC's work plans completed during Phase I. In order to accomplish the objectives of the second phase program, URSGWC combined the skills and experience of its in-house staff along with specialized subconsultants to perform the following tasks:

- Geophysical survey of drum disposal area.
- Eight 10 to 18 foot deep trenches to confirm disposal area limits and the condition of buried drums.
- Drilling of 71 borings to determine aerial and vertical limits of contamination and chemical sampling for soil/waste characterization and treatability testing.
- Compatibility testing and pre-screening of over 500 contaminated soil/waste samples using onsite laboratory facilities.
- Excavation, removal, overpacking, sampling/testing, and temporary storage of 100 drums within a secure, onsite storage pad.
- Laboratory analysis of 350 samples.
- Treatability testing (muffle furnace) of contaminated soil and waste over a range of thermal exposures (simulating conditions experienced in commercially available incinerators) to determine residual hazardous constituents and the effectiveness of toxic organic removal.

Project Profile

An on-site laboratory equipped with 3 gas chromatographs was used during the investigation to pre-screen field samples for site-specific indicator parameters. This component of the field investigation effectively reduced the number of samples requiring characterization by providing a quantitative basis for sample collection, while facilitating a more effective allocation of field effort. Compatibility tests were also performed in the field on waste/soil samples to determine the compatibility of the different waste types prior to chemical analysis and compositing of representative samples for thermal treatability testing. All subsurface explorations within the drum disposal area were performed using Level B protective measures.

URSGWC completed Modification 1, Field Investigation Program, within budget and on schedule. Based upon the results of this field investigation program, Modification 2, a Supplemental Field Investigation, was performed to characterize drum conditions which were not reported or accounted for in the EPA RI/FS. This program was also on budget and schedule.

URSGWC's Site Coordinator was particularly resourceful in maintaining the schedule when the site owner refused access on the day large equipment was delivered to the site. Rather than lose the reshipping time and absorb additional shipping costs, URSGWC's Site Coordinator quickly arranged for temporary storage on property adjacent to the site until such time as the owner gave permission for access. Due to these actions, there were no schedule or budget variances.

URSGWC has submitted a draft report to USACE, the issuance of a final report is pending further direction from the EPA which is conducting a review of ROD specialized concentration limits. Under the terms of the contract, USACE has the option to require URSGWC to develop construction contract plans and specifications for bid documents, conduct reviews of shop drawings and provide technical support during RA construction.

MARATHON BATTERY-SEVENSON

SCOPE OF SERVICES

- Wetlands Remediation Design

CLIENT

U.S. Army Corps of Engineers, New York District

LOCATION

Cold Springs, New York

COMPLETION DATE

1995

The project involves remediation of contaminated soils and wetlands at an old industrial facility located on the Hudson River. A remediation design was completed by the U.S. Army Corps of Engineers' consultants prior to the project being taken over by Gould Inc., the Settling Work Defendant. URS Greiner Woodward Clyde (URSGWC) worked for the remediation contractor, Severson Environmental, to revise the existing design through value engineering proposals which resulted in reduced schedule and costs while enhancing the end result of the remedial design.

Specifically, URSGWC prepared the revised design documents, including plans and specifications, and spearheaded the approval process. The redesigned features included:

- Redesign of a proposed 80 ft. wide x 1,800 ft. long earthen dike overlying soft organic clays and peat by utilizing geogrid and a temporary multi-chamber water-filled containment structure. Reducing the schedule by 12-months by eliminating a specified consolidation period.
- Redesign of a proposed dredge spoil dewatering system and dredge water treatment process by substituting a land-based treatment plant for the originally-specified settling basin located within a contaminated marsh. Allowing marsh restoration to proceed concurrently with dredging.
- Optimization of the required dredge spoils solidification/stabilization process greatly reducing disposal costs by reducing the additive amount from 50% to 2%.
- Instituted soil washing of contaminated site soils excavated for treatment and off-site disposal, to allow for reuse on-site, greatly reducing disposal costs and the need for off-site fill.
- Realignment of a required railroad spur to increase available staging area.
- Design of a 24-foot high dust control fence.

Project Profile

- Redesign of a marsh excavation and restoration plan. This included evaluation of the original marsh re-vegetation scheme. Input on this task was obtained from the National Audubon Society, NYSDEC, the USEPA and wetland evacuation consultants. Recommendations adopted included:
- Identification of alternate species to be used in the revegetation scheme based on evaluation of species shown to be adapted to local tidal zones;
- Use of local seed, obtained from plants growing adjacent to the existing marsh, for propagation to ensure that locally - adapted ecotypes are used for re-vegetation;
- Creation of a performance specifications to determine marsh grades after remediation, based on the on-going chemical analyses of the marsh soils;
- Substitution of a geosynthetic clay liner.

Through a cooperative, yet aggressive approach, design and approval of the above changes were accomplished in four months. This impressively quick turn-around involved approvals from Gould to USEPA and their consultant, U.S. Army Corps of Engineers; New York State Department of Environmental Conservation; and the Town of Cold Springs.

These value engineering proposals reduced the construction schedule from the contract estimate of nearly four (4) years to an actual schedule of approximately twelve (12) months, with a proportional savings in cost.

NEW YORK STATE HAZARDOUS WASTE "STANDBY" CONTRACT

SCOPE OF SERVICES

- On-Call Services
- Site Assessment
- Remedial Investigations/Feasibility Studies
- Remedial Design
- Construction Phase Services

CLIENT

New York State Department
of Environmental
Conservation

LOCATION

New York Statewide

COMPLETION DATE

1996

URS Greiner Woodward Clyde was awarded New York State's first 7-year, \$15 million Task Order Contract to provide site assessments, RI/FS, remedial design, and construction-related services at hazardous waste sites throughout New York State. The contract, a cost-plus-fixed fee type, was established to allow the State to act more quickly in hazardous waste site contamination problems. During the first 3-1/2 years of the contract, URSGWC initiated 21 task order assignments at 84 sites. Of these assignments, 15 have been successfully completed to date, including 59 Phase I (Preliminary) and Phase II assessments; 2 remedial investigations, 2 feasibility studies, 2 remedial designs, and 3 remedial actions. Work in progress includes management of a closed hazardous waste site which formerly was the State Superfund's highest-priority site, a remedial investigation/ feasibility study, a rapid response action, and Phase II investigations at 8 inactive hazardous waste sites. Based upon the quality of the work products, URSGWC's contract was recently expanded to \$20 million. Examples of four assignments include:

- *Phase I/Phase II Studies* - Twenty-nine (29) preliminary site assessments (Phase I) have been completed across New York State. The purpose of these studies is to evaluate suspected inactive hazardous waste sites. Activities include site inspection, records search, completion of USEPA's Site Inspection Report, hazard evaluation through development of the Hazard Ranking System score, and recommendations for further study or for delisting. Of the 29 sites investigated, 11 have so far been delisted. URSGWC completed 13 Phase II studies in one 12-month period, and an additional 17 the following year. These studies included geophysical surveys; sampling of soil, surface water, sediments, and

Project Profile

groundwater; air monitoring; and refined hazardous ranking scores. The information was then assessed, and reports prepared detailing the work performed and recommending further work or site delisting based on the site's threat to human health and the environment. Of the 30 sites at which Phase II studies were performed, 8 sites were delisted, 5 advanced to the RI/FS stage, and the remaining are pending action by the State.

- *Remedial Investigation/Feasibility Study* - Remedial investigations have been performed at the Frontier Chemical site in Pendleton, New York, and at the Gorick C & D Landfill site in Kirkwood, New York. Field investigations have included soil gas surveys, geophysical studies, advancement of borings in the fill and surrounding areas, installation of monitoring wells, and collection of samples for analysis. At the Frontier Chemical site, 29 first-round and 28 second-round samples were taken from 19 shallow, 12 intermediate, and 8 deep wells along with surface water and sediment samples from an onsite lake. Soil samples were taken on site and off site. Analysis revealed volatile and semivolatile organics, PAHS and PCBs in the shallow groundwater and high concentrations of metals in the lake sediments.

At the Gorick site, 14 monitoring wells were installed, and, along with 6 existing wells, were used for groundwater monitoring. Sixteen (16) samples of groundwater, along with soils and surface waters, were analyzed for contaminant content. Analytical results indicated that the primary contaminants were TCE and 1,2-DCE. Based upon results of these investigations, an assessment was made (using USEPA methods) of the potential risk to human health and the environment.

Feasibility studies were carried out at both of these sites to select the most appropriate remedial measures for each site. At Frontier, the selected remedy consisted of removal and stabilization of lake sediments, installation of a groundwater

Project Profile

collection and treatment system, and containment of the contaminated area with a sheetpile wall and a low-porosity cover. At Gorick, an air stripping column already being installed at a nearby affected well field was determined to be an adequate remedial measure. Following selection of a final remedy, RODs were issued with URSGWC input, at both of these sites.

At the North Franklin Street site, URSGWC was highly commended by NYSDEC for our thorough, well organized, state-of-the-art approach to performing the RI at the North Franklin Street Site, Watkins Glen, New York, and was given the highest possible rating (20/20). In response to the emergency work assignment, URSGWC developed comprehensive Work Plans and completed the first-phase RI and IRM Assessment for this former dry cleaner site within five months of Notice to Proceed. A geoprobe and onsite GC, with confirmatory laboratory analysis, were used to trace contamination in soil gas, soils, and groundwater. Twenty-three (23) monitoring wells were installed based on the geoprobe sampling on this site and on the adjacent property slated for major commercial development. The second-phase RI and the FS are also being expedited without any loss of quality or detail, so as to develop a ROD within a year.

URS Greiner Woodward Clyde also conducted a survey of private wells in the area surrounding the Frontier site. URSGWC finalized an RI/FS with further site investigations at the Bedford Mall and Arcade sites in Bedford, New York. Both sites had been sources of TCE contamination of groundwater. Samples for analysis were taken from existing monitoring wells, privately owned wells, and newly installed upgradient wells. It was subsequently determined that installation of carbon adsorption units at each home would satisfy remediation requirements. Community relations was an important part of all these assignments. URSGWC assisted NYSDEC at four public meetings for the Frontier site and two for the Gorick site.

Project Profile

- **Design and Construction-Related Services** - Detailed design services were provided to protect a municipal water supply in Kirkwood, New York. Design services focused on treatment of organics (TCE) entering the water supply from a nearby landfill. Preliminary and final design included upgrading the municipal well pumping capacity, and providing and installing 2,000 gpm air stripper columns for removal of organics. Field oversight services included full-time inspection and assistance to the State in construction management during the installation and subsequent revisions to the facility.

At the Pfohl Brothers Landfill, URSGWC was responsible for oversight activities and Quality Assurance for the construction of Interim Remedial Measures at the Pfohl Brothers Landfill in Cheektowaga, New York. The work consisted of excavation and removal of 4,000 drums of contaminated material and 400 tons of contaminated soil. URSGWC also performed audits and validation on all analytical laboratory test results, which had indicated that most drums and soils were contaminated with dioxin/furan.

- **Rapid-Response Actions** - URSGWC was tasked at three sites with actions requiring rapid response. These actions involved field investigations to identify the source of contamination, including that affecting a village water supply. Timely environmental sampling with chemical and remedial design analysis, provided cost-effective solutions to these high-impact problems. In each case the contractors and equipment required to implement the remedial solutions were provided promptly on extremely short notice.

GLOBAL LANDFILL SUPERFUND SITE REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SCOPE OF SERVICES

- Remedial Investigation
- Remedial Design
- Subsurface Investigation
- Health Risk Assessment
- Ecological Risk Assessment

CLIENT

New Jersey Department of
Environmental Protection

CLIENT CONTACT

Mr. Luis Sanders
609-292-9880

LOCATION

Old Bridge/Sayreville, New
Jersey

DURATION

1993-1997

The Global Landfill Site is located in the drainage basin of Cheesequake Creek in the Town of Old Bridge, Middlesex County, New Jersey. The landfill is situated along a tidal marsh approximately three-quarters of a mile southeast of the intersection of Ernston Road and Route 9. The site includes the 58-acre landfill, which consists of a 51-acre mounded fill area and a 6.5-acre filled extension area. It also includes the areal extent of contamination emanating from the landfill to the surrounding wetlands. The site is bordered to the northeast, southwest, and southeast by wetlands.

The landfill was permitted for solid waste disposal from approximately 1968 to 1984 when, after a slope failure, it was required by court order to cease operations. A geotechnical investigation was conducted in June 1984 to assess the cause of the slope failure and determine the stability of the remaining slopes. Additionally, the groundwater was monitored by installing ten wells at the Site. In November 1985, Killam Associates (Killam) was contracted to develop a design for the proper closure of the landfill. Five additional wells were installed to obtain information on groundwater flow patterns and background water quality conditions. Killam investigated eye witnessed reports of drums buried at the site. In March 1988, 63 drums were found in the 6.5-acre fill area along the northwestern slope. Subsequently, the Global Landfill Site was placed on the USEPA National Priorities List in March 1989. The remedial actions at the site were organized in two operable units by NJDEP and USEPA. Operable Unit 1 (OU1) addresses landfill soils, leachate, and gas emissions. In June 1991 a Record of Decision (ROD) for OU1 was signed specifying that the site be capped, leachate and gases collected, and landfill slopes stabilized. Operation Unit 2 (OU2) addresses management of contaminant migration from the landfill into groundwater, and wetland areas.

In March 5, 1991, NJDEP contracted URS Greiner Woodward Clyde (URSGWC) to conduct a comprehensive Remedial Investigation/Feasibility Study (RI/FS) of the Site. The RI included sampling of surface and subsurface soils, leachate, surface water, sediments, groundwater, and landfill gases. Several

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contaminants were detected in many samples in all media sampled. These results are included in the RI Report, and are also summarized in the Final FS Report. The data was used in a contaminant fate and transport analysis to determine the nature and extent of contamination associated with the site.

Major issues addressed by this RI/FS included the nature and extent of contamination of groundwater, surface water, sediments, soils, and air, and the hazards associated with them. The impacts of contamination from this landfill were assessed on over 600 acres, most of which are tidal wetlands. URSGWC followed USEPA's most recent guidelines for the two-phase environmental assessment. In addition, a two-phase air quality assessment program was developed for this site, first to characterize landfill gas emissions using specially designed and constructed flux chambers and summa canisters, and then to monitor ambient air quality, particularly in the densely populated areas northeast of the landfill, where offensive odors cause a major problem.

The Phase I field investigation consisted of subsurface geophysical investigations, groundwater sampling, leachate seep characterization, surface/subsurface soil sampling, landfill gas emissions characterizations, surface water/sediments sampling, wetlands delineation, and ecological assessment. All samples were tested and analyzed for pesticides, PCBs, heavy metals, and other priority pollutants. Soil samples were also tested for geotechnical properties. All sample locations were surveyed and mapped. The Phase I RI Report included groundwater modeling/fate and transport analysis and a public health risk assessment. A Phase I Feasibility Study was prepared which identified remedial-action-specific data requirements for the Phase II field investigation. The Phase II RI Report included results of toxicity testing and chemical analysis of wetland sediments and a quantitative ecological risk assessment based upon USEPA-approved models. Supplemental wetlands delineation and mitigation studies, offsite groundwater sampling and analysis, and a Stage 1A archeological investigation were also incorporated in the Phase II RI Report. The Phase II and III FS Reports addressed development and detailed evaluation of alternatives. The Final FS Reports included a conceptual design of the recommended alternative that achieves the goals and objectives for remediation in the most cost-effective manner.

URSGWC developed and implemented a sampling and analytical program to establish surface water and sediment chemical background level at the proposed point of discharge located on a

Project Profile

stream which eventually empties into the Atlantic Ocean. Field data was collected to determine ideal influence, stratification, fresh water flow rates, and stream profile. The field data was used to model the mixing process and plume migration at the proposed discharge point. The model was also used to simulate different submerged outfall arrangements (depths, flow rates, etc.) during critical storm conditions. Model results were used to determine a suitable outfall arrangement and the subsequent dilution factor based on this arrangement so that discharge criteria may be established.

Continuous monitoring of groundwater elevations, and surface water sampling during low/high tides also were included in the remedial investigation to assess tidal influence on contaminant migration and surface water discharge limitations for discharge of treated groundwater to Cheesequake Creek, which is part of the Raritan Bay estuary. The resulting effluent limitation stream study report included results of computer-generated mass balance analysis which established maximum allowable discharge concentrations.

Based on the RI findings, a Baseline Health Risk Assessment (BHRA) was conducted to estimate the risks associated with current and future site conditions. The BHRA estimates the human health risk which could result from the contamination at the Site if no remedial action were taken. The analysis assists in evaluating whether remediation is necessary. The results of the baseline health risk assessment are detailed in the RI Report and summarized in the Final FS Report, and indicate that the media at the site pose an acceptable risk to human health.

URSGWC completed an Ecological Risk Assessment (ERA) in 1995. The data are provided in the Supplemental Remedial Investigation Report (SRI) and summarized in the Final FS Report. The ERA indicates that contaminated sediments near the landfill do not pose significant, quantifiable, ecological risk except in the immediate vicinity of an active leachate seep. Therefore, the extent of significant ecological effects is limited to the immediate proximity of the landfill. Ammonia, a leachate constituent, was identified as the primary cause of the acute toxicity. The ROD for OU1 provides for leachate control measures that will mitigate future adverse effects from ammonia. Also, the sediments in this leachate seep area will be addressed by the placement of a cap and associated perimeter berms under the OU1 remedy.

Project Profile

The results of the RI were used in the FS Report to identify and evaluate remedial alternatives to address contaminant migration from the site into nearby groundwater, surface water and sediments. The alternatives had to be protective of human health and the environment. The alternatives for the groundwater and sediments, the two media of concern, were evaluated in detail with respect to the criteria established under the Comprehensive Emergency Response, Cleanup and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA). The Final FS was submitted to NJDEP in March 1995. NJDEP and USEPA then evaluated the remedial alternatives, leading to the selection of a preferred remedial action in a ROD for OU2.

An Additional Ecological Investigation was conducted for the Global Landfill Group in October 1995 at NJDEP's request, and a final report was submitted to NJDEP in March 1996. The objective of this study was to confirm the lack of significant adverse impacts to the wetlands ecological receptors from the shallow groundwater at the site.

All samples were located in areas that are subject to regular tidal inundation. The two reference locations had similar ecological habitat to the five sampled locations close to the landfill and are hydrogeologically isolated by Cheesequake Creek from shallow groundwater emanating from the landfill.

The 1996 AEI results confirm URSGWC's initial ecological investigation findings suggesting that the Global Landfill is not having a significant adverse impact on the adjacent wetland ecology (with the exception of one localized leachate seep at the toe of the landfill to be addressed under the OU1 remedy), and therefore active remediation of the shallow groundwater at the Site is not required or warranted at this time.

The results of the RI and SRI were used to conduct the FS for OU2. The FS addressed the remediation of groundwater in the UWZ which has been contaminated by leachate, and by direct contact with landfilled waste. Groundwater quality criteria exceedances in the UWZ were widespread at the site. Limited residual groundwater contamination was observed in the Lower Water-bearing Zone (LWZ).

Project Profile

Surface soils, leachate surface seeps, and landfill gas management will be controlled by an impermeable cap, leachate collection/treatment, and landfill gas management system, specified in the ROD for OU1. Subsurface soil samples were in compliance with applicable NJDEP cleanup criteria. Surface water does not pose a risk to human health, based on the low frequency of detection and concentration of contaminants. The pesticides and metals concentrations detected in surface water are attributed to uncontrolled leachate, which will be collected and treated as part of OU1.

The results of sediment sampling indicated the presence of several organic and inorganic compounds, distributed fairly uniformly, in background and downgradient samples. Two ecological risk assessments were conducted to determine the toxicity of wetland sediments in the vicinity of the landfill and it was concluded that the extent of significant ecological effects is limited to the immediate proximity of the landfill. Ammonia, a leachate constituent, has been identified as the primary cause of the acute toxicity. In accordance with the ROD for OU1, leachate will be collected and treated, thus eliminating future ammonia discharges. Therefore, extensive remediation of wetland sediments is not warranted.

The 1996 AEI supported the previous conclusions by URSGWC from its 1995 ecological investigation. Based on the results of the ecological investigation, the consensus of the agencies is that shallow groundwater does not have a significant adverse impact on the ecological receptors. Although certain chemical constituents in the shallow groundwater may exceed groundwater ARARs, groundwater remediation is not warranted at this time due to the lack of any adverse impact on ecological receptors, as well as the lack of significant impact on human receptors. The establishment of a Classification Exception Area (CEA) will restrict use of the shallow groundwater. A Declaration of Environmental Restrictions (DER) will prevent exposure to contaminated sediments left onsite. The CEA shall also act as a Well Restriction Area (WRA). The leachate seeps will be mitigated as part of the remedial action associated with OU1.

URSGWC is also providing services to study and ultimately develop critical instream waste concentrations so that permit criteria for direct discharge of treated groundwater and leachate form the

Project Profile

Global Landfill site, Old Bridge, New Jersey, may be established. This work is required to evaluate remedial alternatives developed as part of the Feasibility Study that URSGWC is performing for NJDEP.

URSGWC conducted a public meeting in January 1997.

HELEN KRAMER LANDFILL REMEDIAL DESIGN AND CONSTRUCTION SERVICES

SCOPE OF SERVICES

- Remedial design
- Regulatory Support
- Permitting
- Construction Monitoring

CLIENT

U.S. Army Corps of Engineers –
Kansas City District

CLIENT CONTACT

Thomas Graff
816-426-2296

LOCATION

Mantua, New Jersey

DURATION

1993

URS Greiner Woodward Clyde (URSGWC) completed a remedial design for this 80-acre NPL site, located adjacent to a stream in Gloucester County, New Jersey. The remedial plan for the site (specified in a ROD), which had been used for indiscriminate dumping of chemical and municipal wastes, included an 80-acre multi-layer cap, an active gas collection/treatment system, a soil-bentonite slurry wall, a 300-gpm onsite leachate/groundwater pretreatment facility, a leachate/groundwater collection system, remediation of three leachate lagoons, and a site security fence. URSGWC prepared this five-phase design utilizing an in-house team of specialists in the civil, electrical, mechanical, geotechnical, chemical/process, hydraulic, groundwater, gas collection, surveying, and construction/cost estimation disciplines, under the direction of an experienced project manager. URSGWC was responsible for all permit applications and regulatory support.

In Phase I, URSGWC submitted a Work Plan, a H&S Plan, a Data Management Plan, a site QA Plan, and a Value Engineering Identification Report within 30 days of the contract award. In Phase II (35% design), URSGWC conducted predesign sampling and analysis and chemical data validation, performed data evaluation, and developed preliminary design. URSGWC also developed technical exhibits to support the community relations program. Through its subcontractors, URSGWC completed borings ranging in depth from 11 to 120 feet to support the design of a 8,350 LF slurry wall which varies in depth from 30 to 70 feet, examined more than 100 Shelby tube samples, and conducted laboratory compatibility tests to design a slurry wall backfill mix.

To analyze post-construction landfill settlements and their effect on cap integrity, a field load-test was conducted on top of the landfill by surcharging, supplemented with topographic survey data for comparison. These data showed the need for

Project Profile

settlement mitigation techniques. URSGWC developed specifications for an extensive compaction of the landfill surface with heavy compactors prior to landfill cap construction to reduce future settlements and improve cap performance. URSGWC constructed six gas wells on top of the landfill and six perimeter wells to characterize landfill gas chemistry. An onsite pilot-scale gas treatability study was also performed. Using these data, a 1,000 cfs active gas collection system was designed, including 80 collection wells penetrating into the landfill refuse, 20,000 LF of collector pipes, and a carbon adsorption and flaring system.

The design included a 3,300 LF leachate collection system constructed using biopolymer slurry and a 300 gpm physical/chemical treatment plant. URSGWC conducted field surveys which included a legal boundary survey for land acquisition. Using sound engineering principles and constructibility analyses, URSGWC determined that the stream relocation concept and pretreatment plant location written in the RI/FS were cumbersome. URSGWC developed alternative remedial designs which resulted in cost savings, and reduced the impact on the flood plain. URSGWC submitted the entire Phase II design, costing \$700,000, within a 75-day schedule.

The Phase III (65 percent) design further developed the remediation, incorporating USEPA, New Jersey Department of Environmental Protection (NJDEP), and USACE review comments. This phase included a 60-day (fast-track) Value Engineering (VE) Study which resulted in recommendations to downsize the plant to 120 gpm, provide a complete enclosure of the site with a slurry wall, and raise the collection trench elevation. This decision was based on 3-D groundwater modeling using the USGS MODFLOW program by McDonald and Harbaugh. The recommendations further enhanced the protection of a major water supply aquifer against future contamination. These were accepted by USEPA and USACE in their original forms, resulting in an 8.6 percent savings in construction cost and improved project quality (reliability).

Project Profile

URSGWC also developed a scope of work for an onsite biological treatability study using three different technologies, updated POTW risk assessments, and assisted USEPA in its negotiations with the POTW agency. Phase IV (95 percent) Final Design was dedicated to completion of construction contract plans, specifications, and cost estimates within a 60-day period.

URSGWC performed a constructibility and biddability analysis to ensure that the design was sound and practical and that change orders during construction would be minimized. After final review of documents, camera-ready bid documents were delivered to USACE for construction bid invitation and contract procurement within a 15-day period. During the bid period, URSGWC assisted the District in responding to bidders' questions, participated in a pre-bid site walkover, and prepared technical addenda to the bid package.

URSGWC provided Title II services, including shop drawing review, monitoring of field construction activities, and assistance in change order reviews. There have been over 800 review submittals, of which more than half required URSGWC' review. URSGWC provided start-up and testing services for the leachate pretreatment facility and the landfill gas treatment plant.

URSGWC met the design schedule for each of the five phases. During Title II services, URSGWC met all contractor submittal review dates without fail and provided other office and field engineering to the Kansas City District in a most responsive manner.

The project included several innovative geotechnical elements. For example, the 3,300 LF leachate collection system was constructed using a biopolymer slurry trenching technique. Also a 2,300 LF, 15 ft wide, maximum 20 ft high roller compacted concrete (RCC) abutment was constructed and low bearing capacity soils below the RCC were stabilized with cement grout utilizing a deep soil mixing technique.

HYATT CLARK FACILITY ENVIRONMENTAL ENGINEERING SERVICES

SCOPE OF SERVICES

- Decommissioning
- Demolition
- Remedial Design
- Construction Support Services
- Asbestos Abatement
- Permitting
- Regulatory Support
- Site Investigations/ Feasibility Studies

CLIENT

General Motors Corporation

CLIENT CONTACT

Ms. Marilyn Dedyne
313-556-0815

LOCATION

Clark, New Jersey

DURATION

1995 (completed)

This was the largest industrial manufacturing site in New Jersey undergoing cleanup under ECRA (now ISRA) for conversion to use as commercial and/or residential property. URS Greiner Woodward Clyde (URSGWC) provided engineering services for the decommissioning, demolition, and remediation of General Motor's (GM) Hyatt Clark facility.

The closure and demolition of this facility required a wide range of technical specialties. Under the NJDEP requirements of an Administrative Consent Order, URSGWC provided site investigations, feasibility studies, remedial design and inspection during remedial action for facility decommissioning.

The 87-acre former bearing manufacturing facility consisted of a 1 million-square-foot manufacturing building; several support buildings; a wastewater treatment facility; an electrical substation; PCB transformers; above- and below-ground tanks; drums of wastes or off-specification chemicals; acid and salt baths; solution and filter tanks; process sewers; a chemical laboratory; a medical facility; tunnels; manufacturing equipment (furnaces, quenching pits, rail yards, cranes, fill areas, compressed gas cylinders, chipping machines, milling machines, presses, etc.); waste piles; over 1 million gallons of process waste stored in two above-ground 750,000 gallon tanks; chip pit (waste lagoon); RCRA-permitted waste storage and process areas; asbestos pipe wrap transite panels, asbestos floor tiles and asbestos roofing; and a power house.

The plant, which stopped production in 1987, was in an extreme state of disrepair, with live electric wires, oil, and chemicals dumped on the floor and walls, inadequate lighting, and open pits and trenches covered with oil and water. The decommissioning program required that the buildings, sewers, and remaining above-ground structures be decontaminated.

Project Profile

The clean structures would then be demolished and the resulting debris recycled, salvaged, or disposed of as non-hazardous (NJ ID-13) solid waste.

The primary contaminants found during the decommissioning, in order of abundance, were asbestos; petroleum hydrocarbons; heavy metals; PCBs; acids; caustic powders; lead batteries; PAHs; volatile and semi-volatile organics; and, mercury switches.

URSGWC conducted two site investigations. The first, which was preliminary in nature, combined both URSGWC's and another firm's field investigations into a single report. The result of the first investigation justified a further assessment of the site, so URSGWC conducted a major field investigation for both above- and below-ground characterization. The above-ground program required sampling of waste storage areas, walls, floors, roofs, transformers, insulated appurtenances, piping sumps, pits, tanks, and waste handling systems inside the plant and its outlying structures.

The results from the program were used to prepare decommissioning and demolition documents, as well as to assess health and safety requirements.

Documentation and environmental services provided by URSGWC during the decommissioning and demolition of the facility included: providing assistance with regulatory requirements; interaction with federal, state and local agencies; review of contractor work; health and safety plans; assisting the owner in preparation of plans, specifications, and field orders; management of health and safety; monitoring of contractors' activities; documentation and oversight of asbestos removal and decontamination activities; verification of decontamination criteria (e.g., removal of oily wastes and construction debris sludges and equipment, and maximizing recycling efforts); oversight of air monitoring for asbestos, organics, and O₂ deficiencies; environmental testing and classification of wastes (most waste was removed by rail); compatibility testing; bulking; manifesting; removal; and, documentation of sewer cleaning. URSGWC also assisted

Project Profile

GM in acquiring the DSW permit, treatment works permit and water allowed permit, and prepared a RCRA closure report for four RCRA-permitted areas. URSGWC also assisted GM with emergency remedial activities, and prepared the final documentation report for submission to the State of New Jersey.

Subsequently, a below-ground sampling program required placing borings and wells at strategically located areas of the site and taking environmental samples for a wide variety of analyses. The site was divided into 24 subareas (units) for investigation purposes. A total of 92 soil borings and 8 monitoring wells were installed to collect and analyze soil and ground water samples.

Concurrently, with the decommissioning activities provided on site, URSGWC developed a list of viable technologies that may have use on the site. These included, among other technologies, low-temperature thermal treatment, and bioremediation of soils. A bench-scale study was performed on bioremediation technology and a desktop study on thermal treatment. A health risk assessment was also performed.

URSGWC developed an ECRA sampling plan (remedial design investigation) which included 129 borings, 23 monitoring wells, and 529 environmental samples. The purpose of this was to further define the nature and extent of soil, and possible ground water, contamination. This plan was reviewed and, with minor modifications, approved by NJDEP and implemented by URSGWC.

Subsequently, URSGWC developed and submitted on behalf of GM, a proposal to NJDEP for the new round of investigations and/or remedial operations which consist of: a UST removal program for 11 underground tanks which includes tank removals, sampling, and clean backfill operations; a free product recovery program consisting of oil-skimmer-collection systems for three wells; a contaminant delineation program consisting of 13 borings and 30 samples for TPH, PCB, Base Neutral, and Priority Pollutant Metals; a biannual ground water monitoring program consisting of 138

Project Profile

samples for VOCs, SVOs, PCBs, metals, cyanide, and, phenols; and a ground water study program consisting of the installation of eight wells to monitor piezometric levels at additional onsite locations.

URSGWC provided the operations personnel and materials for site maintenance, provision of utilities, NPDES sampling, analytical and compliance services, and site security. In addition to logistical and compliance support at the site, URSGWC is performed a risk-based focused feasibility study for the client, wherein technologies such as recycle/reclamation, solidification/stabilization, bioreclamation, and offsite disposal were being developed for a fast-track (paralleling SACM concept), environmentally acceptable, cost-effective site cleanup.

URSGWC staff on the Hyatt Clark project received a special commendation from General Motors for a job well done. GM complimented URSGWC on the quality of its work which was completed under extremely trying circumstances. Further recognition of URSGWC's technical excellence was GM's continuing use of the firm to perform work for soil and ground water cleanup.

ROEBLING STEEL SUPERFUND SITE REMEDIAL DESIGN

SCOPE OF SERVICES

- Remedial design
- Groundwater Investigation and Treatability Studies
- Subsurface investigations
- Site Mapping
- Plans and Specifications
- Construction Related Services
- Construction Oversight

CLIENT

U.S. Army Corps of Engineers,
Kansas City District

CLIENT CONTACT

Thomas Graff
816-426-2296

LOCATION

Roebling, New Jersey

DURATION

1998-present

URS Greiner Woodward Clyde (URSGWC) was awarded a one base year and four optional year IDTC by the U.S. Army Corps of Engineers, Kansas City District, to provide remedial design and related design studies at this 200-acre NPL site located on the banks of the Delaware River. The scope of required services includes design-related services such as site mapping, subsurface investigation program design and implementation, above ground demolition of facilities, groundwater investigations, treatability studies, geotechnical and material studies, development of engineering design reports, plans, and specifications for construction, construction cost estimates and schedules, and construction-related (Title II) services, such as shop drawing and contractor's submittal review, and field oversight. Also, URSGWC provides community relations support to USACE and USEPA.

The Roebling Steel site (NPL Rank 47) is an inactive facility located in the Village of Roebling in Florence Township, Burlington County, New Jersey. Residential properties are located in close proximity to the west and south of the site. The Roebling Park, a public playground, is located adjacent and southeast of the site. A key issue and feature of the site is that it is bounded on the north by over a mile of extremely scenic sections of the Delaware River. Groundwater is the source of water supply in Roebling and throughout Florence County. The site consists of approximately 55 buildings connected by a series of paved and unpaved access roads occupying most of the site. From 1960 to 1982 the facility was used primarily for the production of steel products. In recent years, parts of the site have been used for various other industrial purposes such as: a polymer reclamation facility, a warehouse facility for vinyl products, a facility to repair and refurbish refrigerated trailers and shipping containers, and to store construction equipment. Due to the size and complexity of the site, the EPA is addressing its remediation in phases or operable units.

Project Profile

Several removal actions were carried out by USEPA and State agencies under Operable Unit 1. URSGWC currently is developing the remedial design for Operable Unit 2 (OU2) which consists of a 34-acre slag disposal area (approximately 1,458,000 cubic yards) and 2.5-acre park area located southeast of the site. The ROD specifies the remedy as follows:

Slag Area: Treatment via stabilization of highly contaminated slag material, grading, and capping of the entire area with a single layer soil cover and vegetation, structural and erosion stabilization of the river bank using rip-rap, and long-term monitoring and institutional control.

Park: Excavation of contaminated soil and disposal at an appropriate offsite facility and backfilling of areas with clean soil.

URSGWC has completed pre-design investigation of OU2 which consisted of developing work plans for, and overseeing two rounds of field work, plus preparation of investigation reports, analyses, and value engineering studies. The predesign investigation covered the following elements.

- Precise horizontal and vertical delineation of hazardous waste with the slag and park areas by conducting over 105 soil borings and over 300 TCLP sample analyses.
- Twenty-nine shoreline samples were taken. Fifteen samples were taken in the above water areas of the shoreline and analyzed for total metals based on the TAL list, and the TCLP extraction method also based on the TAL metals list. Fourteen samples were taken in flooded areas of the shoreline and analyzed for total metals based on the TCLP list.

Project Profile

- Geotechnical and hydraulic stability analysis of the Delaware River shoreline by collection of undisturbed samples for triaxial shear analysis from cohesive soil layers beneath the shoreline, collection of grain-size samples of the river bank, and conducting 32 cross sections of the shoreline and extending at least 50 feet into the river.
- Visual assessment of the river bank for erosion and structural undermining from past storm events using video cameras, on-shore and off-shore inspection, and logging techniques.
- Assessment of the degree to which the identified "hot spots" are impacting the groundwater by installing and sampling 13 monitoring wells.
- Assessment of the degree to which the 6 to 7 foot tidal fluctuation in the river impacted groundwater levels in the slag by installing 22 piezometers and conducting a 15-hour water level survey of those and the 13 monitoring wells.

URSGWC is using the results of the second, third, and fourth items identified above to aid the USACE in conducting Value Engineering analysis of remedial elements selected for the site by the USEPA.

URSGWC will utilize the results of the groundwater sampling to determine the extent that portions of the slag area exceeding TCLP (hazardous waste) criteria are actually impacting the groundwater. Based upon these results, it may be possible to demonstrate that excavation, solidification/stabilization, and replacement of slag "hot spots" are not merited in this case. Such a determination could save several millions of dollars in construction/remediation costs.

Project Profile

For OU4, URSGWC is providing decontamination of 75 buildings, demolition of 20 buildings deemed to be unrecoverable, and restoration of the historic gate house, building one. The site is part of a historic district, and URSGWC is preparing the Memorandum of Agreement and Cultural Resources Mitigation Plan for the site. To categorize historic assets of the site, over 25,000 drawings and over 2,500,000 pages of documents and all buildings, and equipment were inspected for historic significance. A field sampling plan to characterize site contamination and to develop improved building cleanup methods is included. Sampling results will be used to develop plans and specifications to prepare remedial bid documents. Also for OU4, 11 USTs will be closed, and the site wide fuel oil system will be drained, and the areas within 100 feet of each building will be cleared of scrap and debris. All work is being done to maximize recyclable materials.

Project Profile

WALDWICK AEROSPACE DEVICES SUPERFUND SITE

SCOPE OF SERVICES

- Remedial Investigation and Feasibility Study

CLIENT

U.S. Environmental Protection Agency

CLIENT CONTACT

LOCATION

Wall Township, New Jersey

DURATION

1985-1993

URS Greiner Woodward Clyde (URSGWC) was retained by the USEPA as part of a six member team to implement the Superfund hazardous waste cleanup program. As part of this cleanup program, URSGWC performed a remedial investigation for a defunct manufacturing facility on the USEPA National Priorities List. Results from soil and groundwater samples indicate that disposal practices at the site have contaminated the groundwater with cadmium, arsenic and tetrachloroethylene.

As part of the Remedial Investigation program, URSGWC conducted terrain conductivity and resistivity surveys to estimate the vertical and horizontal extent of groundwater contamination. Results of these studies were used in locating observation wells for groundwater sampling. After completion of the geophysical surveys, a soil gas survey was initiated to evaluate the lateral and vertical extent of selected volatile organic compounds (primarily tetrachloroethylene and trichloroethylene) in the unsaturated zone. This procedure consisted of extracting gas samples from the unsaturated zone through thoroughly decontaminated probes driven to different levels within the soil. Immediately, upon extraction, the gas samples were analyzed on-site using a Varian 3400 Gas Chromatograph. Quality assurance was maintained by sending selected duplicate samples to an outside laboratory for analysis. Preliminary results of the soil gas analysis program have indicated that it provides cost-effective quantitative data. After a review of the results by the USEPA, the program was expanded to include other areas of the site.

URSGWC was involved in other on-site investigative activities such as test pits, test borings, monitoring wells, surface water sampling, surface soil sampling, and groundwater sampling. The results of these activities were summarized in the Remedial Investigation Report. Upon completion of the Remedial Investigation report, URSGWC prepared a Feasibility Study for remediation of the site including review and recommendation of alternative cleanup methodologies.

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT FOR SUPERFUND SITES

SCOPE OF SERVICES

- Ecological Risk Assessment
- Permitting
- Human Health Risk Assessment
- Remedial Investigation/Feasibility Study

CLIENT

Engineering Field Activity
Northwest – US Navy

CLIENT CONTACT

LOCATION

Various, Washington

DURATION

Background

Historical maintenance and operational activities at the Whidbey Island Naval Air Station has resulted in the release of a wide variety of chemicals into the environment. Chemicals of interest include organochlorine pesticides, polychlorinated biphenyls, semi-volatile organic chemicals, inorganic chemicals, and toxic constituents of petroleum. Chemicals have migrated from source areas into a surface water drainage system that includes freshwater streams, an estuarine lagoon, and ultimately the nearshore marine habitat. The runway area and drainage systems provide habitat for a dense population of small mammals and hawks, a local heron rookery, and a variety of aquatic organisms. The air station has been designated as a federal Superfund site. Regulatory agencies were concerned that exposure to soil- and sediment-borne chemicals could pose a threat to these natural resources. URS Greiner Woodward Clyde (URSGWC) was retained to conduct a remedial investigation/feasibility study (RI/FS) to determine if chemicals present in the environment pose unacceptable threats to human health or ecological organisms and to provide an effective remedial action plan.

A comprehensive plan for the baseline ecological risk assessment was developed in consultation with the client and regulatory community. Components of the risk assessment included:

- Evaluation of background concentrations and toxicity thresholds of chemicals in soil, sediment, and surface water
- Food chain modeling of risks to small mammals, raptors, and fish eating birds and mammals
- Laboratory sediment toxicity testing program
- Evaluation of sediment dwelling invertebrate population diversity and abundance

Project Profile

Results

Results of the ecological risk assessment showed that there were minimal risks to organisms in the terrestrial habitat, but risks to fish and aquatic invertebrates were identified for a number of chlorinated pesticides, PCBs, semi-volatile organic chemicals, and inorganic chemicals associated with sediments in the stream and estuarine habitats. Results of sediment chemical screening, sediment toxicity tests, and a benthic invertebrate community survey were used to identify localized areas in need of remediation in the stream system. Evaluation of the water and sediment quality characteristics and biological surveys indicated that the stream systems were naturally of poor habitat quality. These results were used to define a limited area for dredging, which was the remedial action for the stream system. Although contaminated sediments in the estuarine lagoon were found to pose potential threats to fish and aquatic invertebrates, results of the evaluation of water and sediment quality characteristics and benthic invertebrate community survey demonstrated that the habitat quality of the lagoon was naturally very poor. Consequently, it was determined that no remedial action was necessary at the lagoon.

Jackson Park Housing Complex

Background

The Jackson Park Housing Complex is a 300 acre site that provides military residential housing to approximately 3,000 individuals. The complex borders Ostrich Bay and provides aquatic recreational opportunities for residents. Prior to 1973, the complex was used as an ordnance production, demilitarization, storage, and disposal area. Contaminants of concern have been released into soil and groundwater and have migrated into the marine habitat. Chemicals of concern include ordnance, inorganics, semi-volatile organics, pesticides, and polychlorinated biphenyls. URSGWC was retained to conduct a remedial investigation/feasibility study (RI/FS) to determine if chemicals present in the environment pose unacceptable threats to human health.

Project Profile

The goal of the baseline human health risk assessment was to quantify risks for populations potentially exposed to chemicals in soil, surface water at outfalls and seeps, intertidal sediment, and clam and crab tissue. Risks for current and future residents and individuals harvesting clams and crabs were evaluated. Components of the risk assessment included:

- Development of site-specific exposure factors for evaluating risks from seafood consumption for a subsistence harvester that is representative of local native american populations
- Development of bioaccumulation models for assessing risks from ingestion of sea cucumbers based upon empirical sediment chemistry data
- Considerable interaction with state agencies (i.e., Health Department, Department of Ecology) and local interest groups, especially tribal communities, was required throughout the scoping and reporting of the risk assessment to insure acceptance of the final results by all parties

Results

Results showed that the greatest risks were to future residents and off-site visitors who harvest clams and crabs at subsistence levels. Antimony, vanadium, 3,3-dichlorobenzidine and pentachlorophenol accounted for most of the risk to the subsistence seafood harvester. However, 3,3-dichlorobenzidine and pentachlorophenol were detected at low frequency in both clam and crab tissue samples and were not detected in on-site soil samples. Cancer and non-cancer risks to recreational seafood harvesters and residents who do not harvest seafood locally were within the EPA acceptable risk levels. Exposure to contaminants in soil, sediment, and surface water from outfalls and seeps did not result in unacceptable levels of risk for any of the exposure scenarios. Remedial actions have not yet been identified for the site.

Puget Sound Naval Shipyard

Background

Puget Sound Naval Shipyard (PSNS) is the Navy's largest shipyard on the west coast of the United States. Its role in fleet support will expand as the result of the closing of other shipyards on the west coast. The shipyard is located on Sinclair Inlet, an arm of Puget Sound whose rate of water exchange with the rest of Puget Sound is low due to the narrow and constricted connection with the rest of the sound. PSNS and Sinclair Inlet are designated as a federal Superfund site. Operable Unit A (OU A), consisting of the western end of the shipyard, is one of three operable units at PSNS. URSGWC was retained by the Navy to perform a remedial investigation/feasibility study (RI/FS) of OU A. Constraints on the study included devising remedial actions for the site which would minimize site risks to human health and ecological receptors in Sinclair Inlet while not interfering with ongoing fleet support activities. Regulatory agencies, Indian tribes and the general public expressed concern that the site posed unacceptable risks to commercial and recreational fish and shellfish harvesters, benthic and pelagic aquatic biota, fish-eating birds, and marine mammals. Chemicals of potential concern at the site included metals, insecticides, chlorinated solvents, and PAHs from petroleum discharges. URS Greiner Woodward Clyde conducted baseline human health and ecological risk assessment as part of the remedial investigation at OU A.

The approach to the baseline risk assessment included:

- Development the RI/FS workplans in consultation with agencies
- Participation in public meetings to inform the general public about the project, and answered questions about the site studies.
- Implemented an extensive sampling program that included chemical analysis of sediments and marine biota, sediment bioassays, and soil and groundwater analyses

Project Profile

- Use of innovative methods with caged blue mussels and resident English sole to assess the extent to which marine biota bioaccumulated site chemicals, and were potentially affected by on-site chemical exposure
- Development of site-specific seafood ingestion rates for application to a subsistence lifestyle that were indicative of exposure for local native american populations

Results

The baseline risk assessments found that ecological risks to terrestrial biota were unlikely due to the absence of adequate wildlife habitat at the site. Some risks to marine biota and fish-eating birds were found to result from bioaccumulation of several metals and insecticides. Risks from contaminated sediment were not considered significant enough to require remediation of sediments. Using USEPA guidelines, risks to human consumers of fish and shellfish from the site, and risks to current and future site workers and occasional visitors were all found to be in the acceptable range. Proposed remedial actions at the site were limited to improving riprap and shoreline protection to minimize the amount of chemicals entering the marine environment from the site.

Project Profile

LONE PINE LANDFILL

SCOPE OF SERVICES

- Wetlands
Delineation/Habitat
Assessment
- Wetlands Mitigation

CLIENT

Lone Pine Landfill Steering
Committee

LOCATION

Monmouth County, NJ

DURATION

Ongoing

Narrative: URS Greiner Woodward Clyde (URSGWC) is providing environmental consulting services relating to wetlands impacts and mitigation to the Lone Pine Landfill Settling Parties Group. URSGWC's responsibilities have included the delineation of wetlands on portions of the landfill property, an assessment of the existing wildlife habitat values on the site, and development of a conceptual wetland/wildlife mitigation plan that will compensate for unavoidable losses that will occur as a result of the capping and slurry wall enclosure of the landfill. The wetlands include those that have developed on and around the landfill as well as natural wetlands that occur around the perimeter of the site. The need for wetland mitigation at the site is based on the substantial requirements of NJDEPE freshwater wetlands regulations and federal Natural Resource Damage Assessment (NRDA) rules. URSGWC has acted as the technical liaison with both the state and federal agencies on both the NJDEPE freshwater wetlands permit equivalency submittal and the NRDA initiated by state/federal trustees. The objective of these negotiations is the issuance of a Covenant not to sue by these trustees.

Project Profile

REMEDIAL INVESTIGATION AND REMEDIAL DESIGN

SCOPE OF SERVICES

- Remedial Investigation
- Soil Erosion/Sediment Control Plan
- Geohydrologic Studies
- Feasibility Studies
- Remedial Alternatives Analysis
- Design Documentation
- 3D Modeling/Animation
- Conceptual Design
- Remedial Design Drawings
- Long-term Pump Tests

CLIENT

Public Service Electric and Gas Company

LOCATION

Paterson, New Jersey

DURATION

Remedial Investigation 1989 – 1996

Remedial Design 1996 - ongoing

Project Background

Remedial Investigation – URS Greiner Woodward Clyde (URSGWC) was retained by Public Service Electric and Gas Company (PSE&G) to conduct a remedial investigation to define the nature and extent of soil and groundwater contamination both on and off-site associated with manufactured gas plant (MGP) operations formerly conducted at the Paterson Gas Plant (Site), to develop and implement remedial corrective actions as necessary and to conduct a Remedial Alternative Analysis (RAA) or Feasibility Study to evaluate and select a remedial strategy to address environmental concerns. URSGWC collected shallow and deep soil samples to determine the extent of soil contamination and installed overburden and shallow and deep bedrock monitoring wells to determine the nature and extent of groundwater contamination, conducted pumping tests to estimate the transmissivity and hydraulic relationships of the underlying aquifers and modeled the hydrologic conditions of aquifers. URSGWC used a groundwater flow and transport model visual (MODFLOW) to simulate current groundwater flow conditions and evaluate the effectiveness of alternative ways of controlling groundwater flow and preventing off-site migration. URSGWC used this information to evaluate various remedial alternatives to address the environmental conditions both on and off-site and developed and recommended a preferred remedial strategy to the client. The remedial design (30 percent complete) consists of placement of a cap over the Site, isolation of the Site by the installation of a barrier wall along the downgradient boundary of the Site comprised of sheet pile and soil bentonite slurry and the installation of a groundwater recovery system consisting of 47 pumping wells and groundwater treatment using oil water separation and dissolved air flotation as primary treatment and a carbon fluidized bed reactor with filtration and carbon polishing as secondary treatment.

Project Profile

Recently, URSGWC was requested by PSE&G to develop a work plan for the investigation of a section of the Passaic River which abuts the western boundary of the Site. The objectives of the investigation are to collect and review existing data and literature regarding the defined study area, and to determine, through a program of field work activities (soil boring/sample collection and analysis), the vertical and horizontal extent and physical and chemical characterization of tar-laden sediments and to characterize potential ecological receptors in the study area. The work plan was submitted for regulatory review in February 1998. URSGWC also submitted the soil erosion and sediment control plan.

Remedial Design - URSGWC has been requested by the client to complete the design of the remedial alternative and prepare technical specifications and detailed design drawings. To complete the design, URSGWC designed long-term pumping tests which included the installation of recovery wells and piezometers. Single and multi-pumping tests were conducted at each well cluster. Groundwater elevations changes were also monitored at the piezometers and monitoring wells both on and off-site. The data collected during the pumping tests will be used to refine groundwater model for the Site. The model will be re-run to simulate the field measurements obtained. The revised model will be used to accurately determine aquifer conditions in order to complete the final design of the groundwater recovery and treatment system.

Principal Client Issues

- Design a groundwater recovery and treatment system to capture groundwater contamination on and off-site.
- Effectively eliminate discharge of groundwater contamination off-site to an adjacent water body.

Solutions Provided by URSGWC

- URSGWC conducted long-term single and multi-pump tests to develop groundwater models. The groundwater models were used to apply particle tracking analyses to determine the extent and efficiency of the plume capture.

Project Profile

- URSGWC will design a groundwater treatment system using proven reliable technologies to treat recovered groundwater.

Client Benefits

URSGWC designed a groundwater treatment system that prevented off-site migration of contamination to the adjacent water body.

APPENDIX B
RESUMES

AREAS OF EXPERTISE

- site remediation
- project management
- design
- feasibility studies

EDUCATION

Manhattan College, M.S.,
Environmental
Engineering, 1977

Columbia University,
B.A., Urban Planning,
1975

REGISTRATION

Professional Engineer,
New York

REPRESENTATIVE EXPERIENCE

Mr. Leahy has twenty years of experience in hazardous and industrial waste management and comprehensive site remediation. His experience includes serving as project director and senior project manager for over one hundred major projects under such programs as CERCLA RI/FS/RD/RA; RCRA Corrective Action; Clean Air Act Amendment (CAAA); and TQM, CAAA, RCRA and Clean Water Act compliance-based pollution prevention. He has extensive experience in managing remedial investigations, feasibility studies, and design projects for the remediation of MGP sites; leachates; contaminated soils, sediments, and groundwater; industrial and municipal wastewaters; and industrial gaseous streams. He specializes in the design of remediation and innovative physical/chemical treatment systems.

- **Pennsylvania and Fountain Avenue Landfill Remediation Project, New York:** Senior Project Manager for the design of multi-phased and multi-disciplined site remediation for two inactive hazardous waste sites under NYS EQBA program. The combined acreage of the two adjacent sites is approximately 400 acres, making this the largest site remediation of its kind in the U.S. Contaminated media include soil, sediment, groundwater/ leachate, non-aqueous phase liquid containing PCBs, and soil gases. The project entails five distinct bid packages, which include two piers in Jamaica Bay; sediment excavation/disposal and aqueous and non-aqueous phase liquid collection, treatment and discharge; and separate closure designs for each landfill, including a Part 360 cap, active gas collection and flaring system, regrading, drainage, and revitalized site end-use.
- **McGuire Air Force Base, New Jersey:** Senior Technical Reviewer for the focused feasibility studies at five sites. Work included evaluating the remedial design of a floating product collection system at the bank fuel storage area, evaluation of the soil removal action at the DRMD, and review of the natural attenuation decisions on two landfill sites. Also responsible for scoping of investigations, development of a treatability study, and the review of all report submittals.

- **Kin-Buc Landfill Remediation Project, New Jersey:** Senior Director for CERCLA FS/RD/RA project conducted for an industrial and solid waste landfill. Duties entailed overall direction for comprehensive remediation scheme for contaminated soil and groundwater, leachate, non-aqueous phase liquid and off-site sediments. Responsible for directing/conducting negotiations with local and state agencies for discharge options and limitations. Directed remedial alternative evaluations and cost estimates. Responsible for scoping and directing multiple phase treatability studies, as well as the preparation of final design documents for the leachate, soil and groundwater treatment systems. In RA phase, authored the Comprehensive Site Remediation Management Plan, as well as served as Senior Director for aqueous phase treatment system installation.
- **New York Air Brake Feasibility Study, New York:** Senior Director for CERCLA FS-based project conducted for operating manufacturing facility. Duties entailed negotiations with local POTW for acceptance and discharge standards for pretreated groundwater; overall direction of comprehensive remediation scheme for contaminated groundwater and soil, and on-site industrial landfill; and review and approval of all remedial alternative evaluations and cost estimates. NYSDEC approved the CAMU concept proposed in the FS for contaminated soils, thereby saving the client several million dollars in treatment and disposal costs.
- **Humphrey Chemical Company, Connecticut:** Senior Technical Manager for industrial site remediation including focused RI and FS, excavation of drums and contaminated soil, aqueous phase liquid treatment system, and a composite cap to enable a functional site end use as a RCRA permitted hazardous waste storage facility. Project entailed negotiations with Federal, State and local regulatory agencies, development of site remediation bid documents, bid evaluation and award assistance, remediation management, and final certification.

- **Turi Landfill, New York:** Project Manager for the planning, treatability studies, funding, permitting, design, construction, start-up and operations of the first full-scale MSW leachate treatment facility in New York State. Secured NYSERDA grant for project as innovative system for treating high-strength waste with minimal energy requirements. Facility received GRCDA (SWANA) award.
- **Orchard Hill Landfill, New Jersey:** Project Director for the development of a patented thermal process for leachate/groundwater treatment utilizing high Btu contaminated soil gas. Duties included directing the design, materials specifications, cost estimating, funding solicitation and procurement, construction, start-up and operations evaluation. Responsibilities also included patent filing and business plan development for system commercialization.
- **Confidential Client, New Jersey:** Project Manager for the evaluation and design of a groundwater treatment system for the removal of high levels of hexavalent chrome. Assisted client in the approval and procurement of a previously-owned chemical reduction system which saved the client over 50 percent of the cost for a new system.
- **Humphrey Chemical Company, Connecticut:** Project Director for a TQM and RCRA-based waste minimization project involving the conversion of direct-fired reactors to an indirect hot oil heating system. Responsible for directing all aspects of the project including selection of boiler system and heat transfer fluid, plumbing design, stress analysis, construction documents and vendor selection. Project resulted in improved yields and less hazardous waste generation with an ROI of approximately 1.5 years. Also, developed scope for facility to retrofit a materials retrieval system so as to prevent the generation of a hazardous waste and to enable recovery of the material for use in manufacturing operations. ROI on this project is approximately six months.

- **IBM Corporation, New York:** Project Director of large-scale waste minimization projects involving the design and retrofit of over 30,000 LF of aboveground industrial wastewater piping and over 20 associated pump stations throughout the manufacturing campus. All new systems were installed without interruption to any manufacturing process. System controls included fiber optics for communication with site security network. Projects included the defining of over 100 point sources, the reduction of flows requiring treatment by elimination of connected non-industrial wastewater sources, and the improvements of point source and aggregate treatment systems.

PUBLICATIONS

Pollution Prevention

"Waste Minimization Awareness Training - Case Studies - Session I," Air & Waste Management Association, Niagara Frontier Section, Waste Minimization and Pollution Conference, Blasdell, NY.

"Waste Minimization Awareness Training - Case Studies - Session II," Air & Waste Management Association, Ontario Section, Hamilton, Ontario.

"The Economics of Integrated Pollution Prevention Practices - Reduction, Recycling, and Re-Use," Air & Waste Management Association, Ontario Section, Toronto, Ontario, September.

"The Economics of TQM-Based Pollution Prevention Practices," NYSDEC Business Council's Fifth Annual Pollution Prevention Conference, Albany, NY.

Groundwater/Leachate Management

"Leachate/Groundwater Treatment System Design Considerations," Waste Tech-Regional Waste Management Conference and Exposition, Somerset, NJ.

"The Development and Implementation of the Al Turi Landfill Leachate Management Program," Government Refuse Collection and Disposal Association (GRCD) International Conference, Vancouver, BC, Canada.

"Design of Contaminated Groundwater/Leachate Collection and Treatment Systems," 63rd Annual Meeting and Exhibition, New York Water Pollution Control Association, New York, NY.

Hazardous Waste Management/Remediation

"Remediation Activities at a Chemical Manufacturing Facility - Case Study," Air & Waste Management Association's International Conference on the Decommissioning of Site and Facilities, Ontario, Canada.

"Conducting a Feasibility Study and Remedial Design - Case Studies," presented at Hunter College, Guest Lecture Series of Graduate Environmental Engineering Program, New York, NY.

"Regulatory Requirements and Engineering Solutions for Industrial Laundering Facilities Which Use Hazardous Materials," presented at International Conference of Industrial Laundering Association sponsored by Division of Textile Rental Services Association, Nashville, TN.

AREAS OF EXPERTISE

- waste management
- contaminant assessment
- site remediation
- site assessment
- waste disposal
- site investigations
- geotechnical engineering
- construction management
- quality control
- health and safety
- industrial hygiene
- air quality
- project management
- exposure assessment
- asbestos remediation

EDUCATION

Cornell University, M.E.,
Civil Engineering, 1974

Cornell University, B.S.,
Civil Engineering, 1973

PROFESSIONAL HISTORY

URS Greiner Woodward
Clyde Staff Engineer to
Consulting Professional,
1974 to date

REPRESENTATIVE EXPERIENCE

Waste Management

Mr. Gaibrois has been involved in waste management projects throughout the U.S. for more than 20 years. These assignments have included site assessments, soil and groundwater contaminant assessments, removal of underground and above ground storage tanks, and remedial action programs for residential, commercial, industrial and government facilities.

Mr. Gaibrois' experience in waste management includes:

- Managing a site cleanup for the Dow Chemical Company at a chemical facility in Sayreville, NJ conducted under New Jersey's ISRA Program. Cleanup activities included removal of contaminated soil, installation of a groundwater extraction and treatment system, asbestos abatement, demolition, wetlands rehabilitation, and site restoration. Mr. Gaibrois was responsible for the preparation of technical specifications, wetlands permitting, and the Soil Removal/Sedimentation Plan; field sampling; development of a Natural Remediation Program; and oversight of cleanup operations.
- Managing a site cleanup for Dynapac Manufacturing, Inc. at a 40 acre industrial site in Mount Olive Township, NJ where heavy construction equipment was assembled. Work at this site included contaminant delineation, removal of underground and above ground storage tanks, aquifer testing, installation of a LNALP recovery system, cleanup of waste pits, investigation of a large on-site spill resulting from a fuel line rupture, excavation and removal of contaminated soil, asbestos abatement, development and implementation of a Natural Remediation Program, demolition of buildings, wetlands investigations, community outreach program, site restoration, and siting of a potable water supply.

PROFESSIONAL ORGANIZATIONS

American Chemical Society

American Society of Civil Engineers

Association of Groundwater Scientists and Engineers

International Society for Soil Mechanics and Foundation Engineering

American Industrial Hygiene Association

TRAINING

Basic Health and Safety
Advanced Health and Safety
Hazard Site Supervisor
Confined Space Entry
Hazard Communication
Construction Safety
Nuclear Gauge Safety
Asbestos Inspector
Asbestos Site Supervisor
Asbestos Management Planner
Basic First Aid
Basic CPR
Bloodborne Pathogens
Transportation Training
Laboratory Safety Standards
Construction Excavations
Underground Storage Tanks
Contaminant Fate and Transport

- Managing environmental compliance during construction of the Essex County Resource Recovery Facility in Newark, NJ including environmental monitoring programs to protect a work force of 600 workers. Mr. Gaibrois managed drum opening and overpacking, air quality monitoring, off-site disposal of contaminated materials, and compliance with NPDES permits.
- Managing environmental site assessments at a wide variety of facilities worldwide including industrial, commercial and residential properties in accordance with ASTM requirements.
- Managing a soil and groundwater contaminant assessment at a site in New Jersey owned by a confidential chemical company. The contaminant of concern at this property was dioxin. Work activities included installation of monitoring wells, drilling of test borings, sampling of drums, on-site waste disposal and compatibility testing, removal of asbestos and demolition of buildings, peripheral site air monitoring and presentations for emergency response personnel. All work activities conducted at the site were performed in either Level B or Level personal protective equipment.
- Preparing engineering aspects of the Remedial Investigation and Feasibility Study for the Waldick Aerospace Devices Superfund site in Wall Township NJ under CERCLA. Mr. Gaibrois was responsible for the preparation of the technical specifications, monitoring well and test boring programs, geophysical programs, vadose zone gas extraction and sampling, contaminant delineation, and geotechnical aspects of the feasibility study.
- Performing investigations and site remediation at numerous facilities where contaminants from leaking underground and above ground storage tanks have impacted soil and groundwater for clients including Xerox Corporation, Dow Chemical Corp., E.I. DuPont, USA Waste Services and Svedala Industries. Mr. Gaibrois has prepared specifications for tank removal and excavation of contaminated soil for underground and above ground tanks.

AWARDS

NYACE Engineering
Excellence-First Prize,
Tribeca Tower, 1992

NYACE Engineering
Excellence-First Prize,
Javits Convention Center,
1986

NYACE Engineering
Excellence-Second Prize,
General Electric
Headquarters, 1984

NYACE Engineering
Excellence-First Prize,
Offshore Pile Study, 1977

- Managing for a RI/FS and Conceptual Design for the NJS lead Superfund Montgomery Township Housing Development/Rocky Hill Municipal Wellfield site in Somerset County, NJ. Mr. Gaibrois was responsible for the development of work plans, Health and Safety Plans, QA/QC project management plan, aquifer testing, geophysical investigation, lineament analysis, remedial investigation, feasibility study, conceptual design, and public presentations.
- Managing a site investigation and cleanup for Kennedy Van Saun at a 13 acre industrial site in Danville, PA under Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2). This site consists of a former munitions manufacturing facility where site contaminants include petroleum products, trichloroethene and heavy metals. Work at this site included a contamination delineation, excavation of contaminated soil, installation and maintenance of a floating product recovery system, removal of underground and above ground storage tanks, decontamination and restoration of drainage structures, demolition of contaminated buildings, wetland investigations and decontamination of the interior of a large manufacturing facility.
- Managing of a site investigation and environmental consulting program for the Solid Waste Management Facility in the Williamsburg Section of Brooklyn, New York for USA Waste Services of New York City. Work at this site included contaminant delineation, groundwater investigation, Phase 1 Environmental Site Assessment, health and safety audit, and removal of underground storage tanks. Site contaminants included petroleum products, bis-2(ethyl-hexylphalythate and heavy metals.
- Managing the environmental field investigation for the Atlantic City-Brigantine Connector Corridor Project in Atlantic City, NJ. This project included the investigation of soil and groundwater contamination along the alignment and performing asbestos surveys at numerous structures along the right-of-way which are scheduled for demolition to construct the Connector.

PUBLICATIONS

Displacement of Landmark Building Resulting from Adjacent Construction Activities (with J.K. Leznicki and M.I. Esrig). Paper No. A007, Geotechnical Special Publication No. 40 ACSE, Vertical and Horizontal Deformation of Foundation and Embankments, June 1994.

Managing the Installation of Augered Cast-in-place Piles (with M.I. Esrig and J.K. Leznicki). Paper No. 940776, Transportation Research Board 73rd Annual Meeting, January 1994.

Tribeca Tower Foundation System (with J.K. Leznicki and M.I. Esrig). Paper No. 1.14, Third International Conference on Case Histories in Geotechnical Engineering, St. Louis, Missouri, 1993.

Loss of Ground during CFA Pile Installation in Inner Urban Areas (with M.I. Esrig and J.K. Leznicki). Paper No. 1842GT, Journal of Geotechnical Engineering, ASCE, June 1992.

- Managing a subsurface investigation and remedial program for the New York State Dormitory Authority at a site where fuel oil from a leaking 20,000-gallon capacity underground storage tank had impacted soil and groundwater, and had seeped into a subsurface electrical vault. Work included contaminant delineation, excavation of contaminated soil, and construction management of environmental aspects of new vault construction and in-place abandonment of the underground storage tank.
- Managing a site investigation and cleanup of the Galley Road Dump Site in Colorado Springs, CO for the Denver Sala Company and PRP Group. Work at the site included contaminant delineation; site control; drum excavation, handling, overpacking and disposal; and asbestos removal, and disposal of contaminated materials.

Construction Management and Geotechnical Engineering

Since joining URSGWC, Mr. Gaibrois has been responsible for subsurface exploration programs, engineering analysis and design, writing of specifications, inspection of construction, and construction management on a wide variety of non-hazardous and hazardous waste projects throughout the United States.

Mr. Gaibrois' construction experience has included foundations (including pile driving, rock socketed caissons, augered cast-in-place piles, spread footings, and mat foundations); pipe jacking; jet grouting; slurry walls; micro-tunneling; rock excavation by blasting; compacted fill operations for dams and buildings; underpinning of structures; braced excavations; pipelines for sewage, water, stormwater and gas; earthen, concrete and masonry dams; removal of underground and above ground storage tanks; groundwater collection and treatment systems; asbestos abatement and building demolition; and siting and development of well fields for public potable water supply.

Building Displacements
Resulting from Pile
Installation in New York
City (with M.I. Esrig and
J.K. Leznicki).
International Conference on
Deep Foundations, Paris,
France, March 19-21, 1991.

In the field, he has supervised the installation of test borings, test excavations, and probes; the installation and monitoring of field instrumentation such as piezometers, monitoring and observation wells, settlement plates, extensometers, slope indicators and plate load tests; and pile load tests.

Mr. Gaibrois' experience in geotechnical engineering and construction management includes:

- Project Manager for URSGWC's activities at the Jacob K. Javits Convention Center in Manhattan, New York. His responsibilities included supervision of the field investigation program; and analysis, design and construction of foundation systems including more than 1200 piles, 100 caissons, spread footings, and mat foundations for the 1,000,000 sq. ft. plan area building.
- Project Engineer for a subsurface investigation and feasibility study for the nine-mile long West Branch Interceptor as part of Staten Island, New York's Oakwood Beach Water Pollution Control Project. As such, he directed the activities of the project surveyors, archeological investigation and community relations program. This project included the drilling of approximately 600 test borings, the installation of about 200 observation and monitoring wells, down-hole logging, geophysical surveys, the logging of test excavations up to 80 ft in depth, and the evaluation of the ecological impacts of construction activities on wetlands located in the project vicinity.
- Project Manager for the design and construction of the foundation of the Duane Street/Tribeca Tower project in lower Manhattan. This project involved the installation of about 800 driven pipe piles and 600 90-ft long augered cast-in-place piles to support a 52-story high-rise structure. Due to designated landmark structures nearly 200 years old abutting the site, an extensive underpinning program and monitoring program was performed.

- Task Manager for foundation construction for New York Hospital Annex in Manhattan, New York. His responsibilities included the underpinning of buildings, installing a braced excavation wall nearly 50 ft high, excavation of rock by blasting, and implementation of a vibration and building displacement monitoring programs.
- Task Manager for jacking of a 60-inch diameter pipe approximately 400 ft. This pipe was installed below the New Jersey Turnpike in Hightstown, New Jersey as part of a project to connect the stormwater drainage systems of two municipalities.
- Senior Technical Reviewer for Construction Management and quality control during construction of a double composite geosynthetic liner system for a 10 acre landfill expansion for the Sussex County Municipal Utilities Authority Landfill in Lafayette, New Jersey. Mr. Gaibrois was responsible for oversight of resident engineering services and claims resolution with the contractor as well as providing senior level support on construction issues.
- Mr. Gaibrois has been a consultant to the New York City Landmarks Preservation Commission and has provided services for the purpose of limiting damage to designated landmark structures as a result of adjacent new construction. These historic structures have included the Fraunces Tavern Historic District, the South Street Seaport/Fulton Fish Market Buildings, Carnegie Hall, the First Precinct Building and the Art Students League Building.

In addition to these projects, Mr. Gaibrois has managed geotechnical studies for the Sea-Land Corporate Headquarters, General Electric Headquarters Expansion, General Foods Corporate Headquarters, Princeton Forrestal Center, numerous high-rise office buildings in Manhattan, AT&T facilities in the New York area, the Columbia-Presbyterian Medical Center Expansion, the Exxon Bayway Refinery, the Port Mobil Terminal, the Rego Park Mall, the Hudson County, New Jersey

Resource Recovery Landfill, the Keio School, the Rahway Sewerage Authority treatment facility, the Monmouth County Waste Recovery Facility, wastewater treatment facilities, and sewer interceptors.

Health and Safety and Industrial Hygiene

Mr. Gaibrois served as the New York Metro Operating Unit's Health and Safety Officer from 1985 to 1990; he currently manages Health and Safety Services for the Operating Unit. In these capacities, he has been responsible for the preparing of more than 600 Health and Safety Plans; teaching OSHA required training courses including Basic Health and Safety Training, Advanced Health and Safety Training, Confined Space Entry Training, Hazardous Communication Training, and Site Supervisor Training; conducting field audits of on-site activities; and ensuring compliance with governmental and URSGWC internal programs including URSGWC's medical monitoring program and OSHA. Mr. Gaibrois has received Level B, C and D training and has completed Red Cross First Aid and CPR Certification. He holds the following asbestos certifications: Inspector, Management Planner, and Site Supervisor.

Mr. Gaibrois has extensive experience in confined space entry work including underground and above ground storage tanks, underground stormwater detention structures, sewers, vaults and water supply tunnels and in personal exposure monitoring programs for hazardous waste and industrial operations.

Mr. Gaibrois has prepared Health and Safety Plans and has been responsible for Health and Safety on a wide variety of hazardous sites including:

- USEPA lead Superfund Sites under the USEPA REM II Contract (e.g., LiPari Landfill, Waldick Aerospace Devices, and Metaltec Aerosystems);
- NJS lead Superfund Sites as a contractor to NJDEP (e.g., Rocky Hill Municipal Wellfield and Montgomery Township Housing Development);

- PRP cleanups of Superfund Sites (e.g., Sayreville Landfill, Galley Road Dump, and Lone Pine Landfill);
- Cleanups under New Jersey's ISRA Program (e.g., Colgate-Palmolive, Dynapac Manufacturing, Inc. and Dow Chemical);
- Work under the New York State Department of Environmental Conservation (e.g., USA Waste Services of NYC);
- Cleanups under the Pennsylvania Department of Environmental Protection's Act II Program (e.g., Pfizer Chemical and Kennedy Van Saun); and,
- Work under the New York City Department of Environmental Protection (e.g. Fresh Kills Landfill and Pelham Bay Landfill).

Mr. Gaibrois has written Health and Safety Plans and served as Health and Safety Officer for landfill remediation operations including site investigations; regrading and earthwork; excavation of landfilled wastes including buried drums; and construction of caps, leachate control systems, gas venting and collection systems, and stormwater systems.

Mr. Gaibrois has also prepared Health and Safety Plans and served as Health and Safety Officer for site cleanup operations including excavation of contaminated soil; on-site thermal desorption of contaminated soil; lagoon cleanups; removal of underground and above ground storage facilities; extraction and treatment of contaminated groundwater; drum excavation, handling, stabilization, overpacking and removal; handling of water-reactive and air-reactive chemicals and explosives; underpinning of structures; building decontamination and demolition; asbestos and lead paint removal; wetlands restoration; foundation and utility construction; and installation of a bulkhead wall.

Mr. Gaibrois has been responsible for Health and Safety on a number of sites for public utilities including electric utilities (e.g., Public Service Electric and Gas Company's manufactured gas plant [MGP] sites in Paterson, Morristown, Camden and Bayonne, NJ and South Jersey Gas Company's MGP sites in Glassboro and Atlantic City, NJ) and water purveyors (e.g., Passaic Valley Water Commission).

Mr. Gaibrois' involvement with site operations has included:

- Oversight of worker compliance with Health and Safety Plans and OSHA Regulations;
- Review of Health and Safety plans prepared by Contractors;
- Preparation and review of incident reports;
- Serving as Owner's Representative during OSHA inspections;
- Performance of site audits;
- Oversight of Contractor's training and medical monitoring programs; and,
- Performance of Site Orientation Meetings and Daily Site Briefings.

Mr. Gaibrois has been responsible for personal exposure programs and site perimeter monitoring programs for substances including nitrous oxides, sulfur oxides, mercury, lead, benzene, asbestos, volatile organic compounds, silica and dust. These projects include:

- Asbestos monitoring during demolition of industrial and commercial facilities;
- Silica and dust monitoring during mining activities on the NYCDEP Queens Water Tunnel project;

- Volatile organic compound and benzene monitoring on a automated peripheral monitoring system during operation of a thermal desorption unit at the site of a former MGP facility in Paterson, NJ;
- Mercury monitoring during operations in a computer facility;
- Volatile organic compound, oxygen, carbon monoxide, and hydrogen sulfide monitoring during confined space entry aspects of construction at the NYCDEP Jamaica Water Pollution Control Project;
- Mercury monitoring during dismantling and decontamination of a mercury-contaminated laboratory facility; and,
- Volatile organic compound, oxygen, carbon monoxide, hydrogen sulfide, benzene, dust, nitrous oxide and sulfur oxide monitoring during work activities which included excavation of petroleum products within a temporary enclosure using diesel powered excavation equipment.

Mr. Gaibrois has been responsible for asbestos surveys and abatement on numerous projects including:

- Seven industrial buildings at the Dynapac Manufacturing, Inc. facility in Mt. Olive Township, NJ;
- Nineteen residences, and eleven commercial and industrial structures along the proposed alignment of the Atlantic City/Brigantine Connector in Atlantic City, NJ; and,
- Equipment and ancilliary piping at Dow Chemical Company's Sayreville, NJ facility.

AREAS OF EXPERTISE

- remedial investigation
- project management
- risk assessment
- hydrogeology

EDUCATION

New Jersey Institute of Technology, M.E.,
Environmental Engineering, 1986

Queens College, City University of New York, B.A., Geology, 1979

Wright State University, Graduate Program in Applied Hydrogeology, 1988

REGISTRATION

Professional Engineer (Pending)

Professional Geologist - Pennsylvania, Tennessee

Certified Professional Geologist - AIPG

NJDEP Underground Storage Tank Certification for Subsurface Evaluation #G0002222

PROFESSIONAL ORGANIZATIONS

National Groundwater Association of Groundwater Scientists and Engineers

REPRESENTATIVE EXPERIENCE

Mr. Pisciotta is a Project Manager with over 15 years experience in project management for industrial, public works, government, and private development clients. Major activities include project and personnel management; the evaluation of environmental liabilities for Brownfield development, the evaluation of cost effective remedial solutions; development of natural attenuation programs; remediation system design including soil removal and treatment, bioremediation, and recovery well systems for water and non-aqueous phase liquids; remedial investigations under a variety of geologic conditions with all major contaminant types; field testing and sampling; delineation of contamination; evaluation of groundwater flow; risk assessment reports, and facility audits; and Phase I Site Assessments.

- **Reich Farm Superfund Site, Dover Township, New Jersey:** Project Manager for the pre-design and design investigations. This \$2 million project involved the delineation of the extent of soil contamination in a former drum disposal area and the delineation of the extent of groundwater contamination and determining its impact on a public water supply wellfield. Detailed focused feasibility studies were then conducted for evaluating remedial measures for both soil and groundwater cleanup. For soil, enhanced volatilization was evaluated by having detailed discussions with vendors of this technology and preparing specifications for a pilot test and design. For groundwater, detailed modeling was conducted by others and the results of the modeling were used to evaluate recovery well techniques. This project involved close coordination with Union Carbide personnel, Federal and state regulators, and the general public.
- **Laurel Park Landfill Superfund Site, Naugatuck, Connecticut:** Project Manager for a \$2 million USEPA Superfund RI/FS. This investigation involved the characterization of complex groundwater flow pathways in a bedrock aquifer, the evaluation of contamination in the landfill and in the surface water and groundwater around the site, the evaluation of landfill closure and

groundwater collection remedial alternatives, and the conceptual design of the selected remedial alternatives.

- **McGuire Air Force Base, Wrightstown, New Jersey:** Project Manager for a \$2.0 million focused feasibility studies of five facility sites. Activities are focused on the development of cost-effective remedial measures for the grossly contaminated sites (the bulk fuel storage area and the jet fuel spill area) and preparing closure reports recommending long-term monitoring or no-further action for 14 other less contaminated sites on the base. The remedial alternatives evaluated through pilot testing for the two grossly contaminated sites include bioventing, bioslurping, passive cutoff wall/recovery systems; and free-product/groundwater collection systems. Activities also include nine site investigations (drilling, soil sampling, hydrogeologic testing), evaluation of the extent of contamination and focused feasibility studies and treatability studies for each of the five sites. Investigations involved delineating the extent of contamination at a bulk fuel storage facility, two spill sites, and two landfills. Also developed risk-based cleanup criteria for soil and groundwater.
- **City of Newark Brownfields Redevelopment Program.** As a partner with the City of Newark, Mr. Pisciotta was involved in the management of the environmental assessments of nine Brownfields properties. This work included assistance in obtaining state grants for the City, coordination with several City departments to facilitate the progress of the projects, preliminary assessments and site investigations of each property, and the management of remedial investigations and remedial action selections. Properties included Central Steel Drum, Synfax, Hudsar, Healy Muspyg, NSC Plating, Royal Recovery, Duralac, and two other City properties.
- **City of Newark Environmental Compliance Program.** Project Manager for the environmental compliance program for all public buildings in the City of Newark. Working closely with each of the major agencies in the City of Newark, Mr. Pisciotta managed the work of a team of six people in developing an effective audit program tailored to the City's needs, conducting the audits without

interference to the City, developing a management database for the use of the City's Department of Engineering, and working with this same department in prioritizing actions based on the audit results.

- **Casino Reinvestment Development Authority, Atlantic City, New Jersey.** Project Manager for a multi-site groundwater investigation and remediation program for the Brownfields Redevelopment of the Atlantic City Corridor. As a partner with the CRDA, his responsibilities on this project included developing the multi-site work plans based on preliminary assessments on over 50 properties, managing the field investigations, evaluating the contamination data to determine impacts from identified areas of concern, developing remedial action decision documents for each investigation site, coordinating with the CRDA and NJDEP regarding the remedial actions, and serving as an expert witness to settle claim disputes. Sites under investigation in this corridor project included several gas stations, a former bus depot, and a former manufactured gas plant (MGP). Innovative remediation was conducted at two of the sites including hydrogen peroxide oxidation of the organic compounds in groundwater and thermal treatment of the soils from the MGP site.
- **Pennsylvania and Fountain Avenue Landfills, Brooklyn and Queens, New York.** Task Manager for the remediation of PCB and fuel oil contamination and the evaluation of groundwater flow. Activities on these projects included field testing of an interceptor trench, evaluation of collector trench options, groundwater modeling, and client support.
- **Former Ciba-Geigy Facility, Cranston, Rhode Island.** Design and Investigation Task Leader for a multi-million dollar RCRA facility investigation and corrective measures study. As an integral member of this design team, my tasks included the evaluation of remedial alternatives for the collection of contaminated groundwater and the cleanup of highly contaminated soils, conducting pilot tests for extraction well systems and for a vacuum extraction system, evaluation of the pilot test data and the design of a recovery well network, conducting

optimization evaluations for the recovery well network, and integrating the recovery well and vacuum extraction system designs with the treatment plant and the Ciba design team requirements.

- **Pelham Bay Landfill, Bronx, New York:** Hydrogeology task manager for the remedial investigation and feasibility study of this former New York City landfill. Activities on this multi-million dollar and rapid time-frame investigation included development of a monitoring well network, hydrogeologic testing, groundwater modeling of multi-layer system, fate and transport evaluation of leachate contaminants, and the evaluation of remedial alternatives for shallow leachate collection and deeper groundwater recovery/treatment.
- **Miles, Inc. Facility, Haledon, New Jersey:** Hydrogeology task leader for a bedrock aquifer restoration. Activities included a detailed evaluation of DNAPL cleanup alternatives, the selection of remedial alternatives for vapor extraction of soils and the extraction of groundwater, and the conceptual design of the selected alternatives.
- **Nassau County Firemen's Training Center, Westbury, New York:** Project Manager for a multi-million dollar New York State Superfund Site RI/FS. This investigation involved the characterization of a gasoline plume, a floating fuel oil plume and a dissolved constituent plume at multiple depths in the sandy aquifers. In addition to the characterization activities, groundwater collection and disposal techniques were evaluated and a vacuum extraction system was designed. The site restoration activities included groundwater collection and on-site treatment.
- **Former Stouffer Facility, Niagara Falls, New York:** Project Hydrogeologist involved with the remedial design of a bedrock groundwater recovery system. This work included the evaluation of aquifer test data, the analysis of capture zones and the detailed specifications of the recovery well systems.

- **Cook Chemicals and Polymers, Inc., Pennsauken, New Jersey.** Project Manager for Phase I Environmental Site Assessments and ISRA site remediation at two chemical plants and bulk storage facilities adjacent to the Delaware River. Activities included soil and groundwater sampling, delineation of contamination, filing ISRA submittals, NJDEP SI and RI reporting, and recommendations to the property buyers on remediation alternatives and costs for potential remedial action.
- **Weyerhaeuser, Inc., Pennsauken, New Jersey.** Task Manager for the groundwater investigation. In this ISRA investigation, major responsibility was to evaluate the groundwater data including groundwater flow conditions and contaminant transport. Negotiated with the NJDEP for natural attenuation for the groundwater which resulted in significant savings for the client.
- **Centrock, Inc., Carteret, New Jersey and DuPont Pompton Lakes Works, Pompton Lakes, New Jersey.** Developed natural remediation compliance programs for these two facilities which resulted in the association of pumping activities and acceptance for a long-term monitoring only as the groundwater remedial action.
- **GATX Petroleum Storage Terminal, Staten Island, New York.** Task Manager for the evaluation of groundwater contamination associated with fuel spills from the bulk storage facilities. Assisted in convincing the NYSDEC to accept a limited containment program for some of the aboveground storage tanks present on the terminal.
- **Route 70 Associates, Lakewood, New Jersey.** Groundwater contamination Task Manager in this litigation case. Conducted a pumping test and groundwater modeling for use in the design of a groundwater extraction system and for determining the source of contamination for cost recovery purposes.
- **ICI Americas, Inc., Multiple Sites in Various States.** Manager for Phase I and Phase II Environmental Site Assessments at sites in New Jersey, Ohio, Michigan and

Illinois. Conducted data searches, site reconnaissance, employee interviews, field sampling activities, Phase I and Phase II reports, represented client at property transaction meetings and developed estimates of environmental liability and projected remedial action for each site.

- **Public Service Electric and Gas, Cape May and Cumberland Counties, New Jersey:** Hydrogeology Task Manager involved with the evaluation of the hydrogeological conditions associated with the restoration of two large salt water wetlands.
- **New York City Division of Building and Construction, Underground Storage Tank Investigations throughout New York City:** Project Coordinator for multiple site investigations and remedial actions at underground storage tank sites on city-owned facilities. This multi-million dollar project involves sampling, tank integrity tests, and the installation and operation of remedial systems.

PUBLICATIONS

"How the New Groundwater Cleanup Standards Will Impact Your Facility." Presented at the New Jersey Pollution Law and Regulation Conference: A Spring 1993 Update, Executive Enterprises, Inc.

"Natural Remediation Compliance as an Alternative to Conventional Pumping and Treatment." (with C. Trione and V. Chang). FOCUS Conference for Eastern Groundwater Issues, NGWA, 1992.

"Enhancement of Volatile Organic Extraction at an Industrial Site." (with Dr. J. Schuring and D. Pry). FOCUS Conference for Eastern Groundwater Issues, NGWA, 1991.

"Remediation of Fuel Oil, Gasoline and Solvent Plumes at a Superfund Site." Presented at the 1990 New England Water Pollution Control Association (NEWPCA) Annual Meeting.

AREAS OF EXPERTISE

- field geology
- geological investigations
- hazardous waste investigations

EDUCATION

Queens College of the City University of New York,
M.A. candidate, Geology

Queens College of the City University of New York,
B.A., Geology, 1978

REGISTRATION

Professional Geologist,
Pennsylvania, Arkansas

REPRESENTATIVE EXPERIENCE

Mr. Naumoff has over 14 years experience in developing, implementing and managing geological and hazardous waste investigations throughout the northeast region. He has served as Project Geologist, Project Manager, and Site Manager for numerous multi-million dollar projects including New York State Power Utility Seismic Investigations, RCRA RI/FS investigations, New York City landfill closures, New Jersey ISRA projects, and Superfund investigations.

He also has extensive experience in field geology with emphasis on mapping igneous and metamorphic terrains in New York and New Jersey, fracture mapping, and structural and petrographic analyses of rocks in the field and in the laboratory. Projects included seismic risk studies of southern New England and Israel. He supervised the drilling and logging of a 1-kilometer-deep borehole in metamorphic rocks in New York, and 1.5-kilometer-deep borehole in metamorphic rocks in Connecticut.

- Pelham Bay Landfill Remedial Investigation, Bronx, NY: Project Geologist; directed and managed staff for the geologic characterization and contamination assessment of metamorphic bedrock and soils at a multi-million dollar New York City landfill investigation under the Resource Conservation and Recovery Act. Budgeted and implemented a \$250k drilling program. Provided major conclusions for an U.S. EPA Record of Decision that resulted in "no further action" for soils. Interacted and coordinated with interdisciplinary task leaders to produce and maintain a consistent, high-quality product.
- Pennsylvania Avenue and Fountain Avenue Landfills, Brooklyn, NY: Remedial Design Investigation Manager; supervised and managed a geotechnical field investigation at two New York City landfills. Directed a field crew for subsurface investigations on land and on water (Jamaica bay), settlement/stability studies, leachate characterization work, and landfill gas studies. Coordinated extensively with NYCDEP and NYSDEC Site Monitors so that project objectives were met.

- McGuire Air Force Base, Wrightstown, NJ: Project Geologist, currently supervising closure activities for eleven Air Force Installation Restoration Program (IRP) sites. Supervising the preparation of Work Plans and directing field activities in compliance with Air Force Policy and NJDEP's Technical Requirements for Site Remediation.
- Colgate-Palmolive Company, Closter, NJ: Project Manager of an Industrial Site Recovery Act remedial investigation for a chromium-contaminated site in northern New Jersey. Responsible for the remediation of soil and groundwater contaminated with solvents and hexavalent and trivalent chromium at a sensitive site in a residential neighborhood. The soil remediation work is currently being conducted under NJDEP's recently proposed "Suggested Soil Cleanup Criteria
- AGA Gas, Inc., New York, NY: Project Geologist; directed Phase I and Phase II Environmental Site Assessments following NYSDEC protocols in Mount Vernon and Brooklyn, New York. Characterized subsurface geological and environmental conditions in an area underlain by shallow metamorphic bedrock (Mount Vernon) and a thick sequence of sediments (Brooklyn).
- U.S. Department of Energy, Office of Crystalline Repository Development: Project geologist, conducted fracture and petrographic investigations of crystalline rocks in the field and recovered in core for preliminary siting evaluations for high-level nuclear waste repositories in the northeast region.
- Empire State Electrical Energy Research Corporation, Consolidated Edison of New York, Indian Point Nuclear Power Plant: Project Geologist, investigated rock fabric of core recovered from the Ramapo Fault Zone for a study on the modern capability of the fault.

- Kennedy Van Saun Facility, Danville, PA: Remedial Investigation Manager; proposed, budgeted, and implemented a \$500k Phase II Initial Site Characterization under Pennsylvania's recently-enacted Land Recycling and Environmental Remediation Standards Act (July, 1995) and Residual Waste Management Regulations for a former manufacturing facility contaminated with metals, petroleum hydrocarbons, and solvents. Proposal was unconditionally approved by Pennsylvania Department of Environmental Protection (PADEP). Directed staff to compile and prepare a Phase II Initial Site Characterization Report. The Phase II report was approved by PADEP in October, 1995.
- Diamond Alkali Dioxin Superfund Site, Newark, NJ: Remedial Design Investigation Manager; supervised and directed field activities for a multi-million dollar design investigation at a dioxin-contaminated site in Newark, New Jersey. Supervised a field crew of up to 20 staff employees and directed health and safety operations, intrusive investigations, and environmental sampling activities. Developed a subsurface investigation strategy and directed a \$450k drilling program on both land and water (Passaic River).
- Keith Clark Facility, Pittsfield, MA: Remedial Investigation Manager; directed the completion of a Phase II Comprehensive Site Assessment under Massachusetts' revised contingency plan (310 CMR 4.00, July, 1993) at a former tannery site contaminated with metals and polynuclear aromatic hydrocarbon compounds. Designed and implemented a sampling program to fill data gaps not addressed by previous consultants. Client received a Massachusetts Department of Environmental Protection "no further action" on the basis of the results of the comprehensive site assessment.

PUBLICATIONS

Structural and Metamorphic Relationships in the Manhattan Schist, Northern Manhattan Prong, New York, Master's Thesis, 1978.

Geophysical atlas of the East Coast, (with P.D. Rabinowitz, J.I. Ewing, B.E. Tucholke, E. Uchupi, and others). Ocean margin Drilling Program, Regional Data Synthesis Series Atlas 4, Eastern North American Continental Margin and Adjacent Sea Floor, 1983.

Ground deformation in the Gulf Coast Region of the U.S. associated with fluid withdrawal from a five kilometer deep reservoir (with C.T. Statton, J. D. Agnew, R.C. Quittmeyer, and D.O. Johnson). Proceedings of the Third International Symposium on Land Subsidence, 1984.

Aftershock survey of the Northeastern Ohio earthquake of 31 January 1986, (with K.A. Mrotek, C.T. Statton, J.D. Agnew, R.C. Quittmeyer, G. Leblanc, and G. Klimkiewicz). EOS, Vol, 67, p. 314, 1986.

Recent shallow swamps of seismicity in Southeastern New York, Northern New Jersey and Central Connecticut, (with R.C. Quittmeyer, K.A. Mrotek, J.D. Agnew, and C.T. Statton). Seismological Research Letters, Vol. 59, p. 197-206, 1988.

Lithology and structure identified in a 1.5 Km borehole near Moodus, Connecticut. EOS, Vol, 69, p. 491, 1988.

Geochemical logging results from the Moodum deep drillhole, Connecticut (with R.N. Anderson, E. Pratson, and R.E. Dove). EOS, Vol. 69, p. 495, 1988.

AREAS OF EXPERTISE

- hazardous waste site characterization and remediation
- contaminant hydrogeology
- groundwater modeling
- project management

EDUCATION

University of British Columbia, M.S.,
Hydrogeology
1981

University of Waterloo,
B.S., Geology, 1979

REGISTRATION

Professional Geologist:
Alberta, Canada (1982)

PROFESSIONAL HISTORY

URS Greiner Woodward Clyde, Consulting
Professional to Senior Consulting Professional,
1990 to date

Vectre Corporation,
Corporate Technical Director, 1984-1990

Ground/Water
Technology,
Project Manager,
1983-1984

REPRESENTATIVE EXPERIENCE

Mr. Jamieson has managed hazardous waste site characterization and remediation projects throughout the United States and Canada. His eighteen years of experience include groundwater modeling, project management of groundwater and soil contamination characterizations and remedial actions; environmental site assessments, groundwater resource evaluation; underground tank management; environmental permitting; and ISRA projects. Specific project experience includes:

- Management of a groundwater characterization and treatability study for the Port Authority at JFK airport related to jet fuel contamination. The work included well installation, aquifer testing and analysis. The analysis was used to develop a capture analysis including well spacings and pumping rates. A treatability study was performed to determine the available technologies to treat the captured groundwater.
- Design of a groundwater containment system for a Superfund Site in Rhode Island.
- Management of the remediation of a New Jersey industrial site contaminated with PCBs and phthalates including characterization, treatability studies, ecological risk assessment, human health risk assessment, feasibility study, and remedial actions associated with soil, stream sediments, pond sludges and floating product.
- Groundwater contamination characterizations and cleanups (dissolved and non-aqueous phase liquids, NAPLs) including monitoring well system design and installation, vertical and horizontal contaminant plume delineation, aquifer hydraulic testing and analysis, plume capture design, remediation system construction, operation and maintenance.
- Characterization of dissolved and DNAPL (dense non-aqueous phase liquid) contamination in a fractured bedrock aquifer in New Jersey. Including design of a groundwater capture system involving extensive groundwater modeling.

Campbell Geoscience,
Hydrogeologist,
1982-1983

Hardy Associates,
Hydrogeologist,
1981-1982

PROFESSIONAL ORGANIZATIONS

Association of
Groundwater Scientists
and Engineers

International Association
of Hydrogeologists

Association of Professional
Engineers, Geologists &
Geophysicists of Alberta

- Management of the Woodward-Clyde national contract with ITT Corporation including the coordination of manpower for projects throughout the United States including baseline assessments, site contaminant assessments, and UST assessments.
- Technical oversight and program development to assess the effects to groundwater associated with wetlands restoration sites in Southern New Jersey. Including assessments of potential salt water intrusion and private well and septic impacts.
- Groundwater computer modeling including model selection, model modification, model calibration to present contaminant plume configuration, modeling future plume configurations, and model and develop remedial plume capture designs.
- Environmental permitting including permit applicability determinations, permit applications and development, state negotiations and liaison, permit implementation and compliance assurance activities.
- Groundwater resource evaluation including available information review and analysis, supply well and monitoring well location and depth determination, well installations and development, aquifer pump testing and analysis and well efficiency and safe yield determination.
- ISRA Project Management including pre-ISRA site assessments, pre-ISRA program development and implementation, ISRA initiation procedures, sampling plan design and implementation, sampling plan results reporting, remedial action plan design, state liaison and negotiations, and remedial action plan approval and implementation.
- Management of UST closures ranging in size from 500 to 20,000 gallons including local and state permitting, tank cleaning, tank removal, soil and groundwater sampling, tank disposal, site restoration and reports to appropriate parties.

AREAS OF EXPERTISE

- Ecological Risk Assessment
- Environmental Assessment
- Aquatic Ecology

EDUCATION

Rutgers University: M.S.,
Zoology, 1981

Monmouth College: B.S.,
Biology, 1976

PROFESSIONAL HISTORY

URS Greiner Woodward
Clyde, Senior Project
Scientist, 1981-present

Pandullo Quirk Associates,
Senior Environmental
Scientist, 1979-1981

Water Resources Research
Institute, Field Technician,
1978

Pandullo Quirk Associates,
Benthic Ecological Task
Leader, 1976-1977

National Marine Fisheries
Service, Biological Aid,
1974-1976

CERTIFICATION

Certified Senior Ecologist,
Ecological Society of
America

Professional Association of
Diving Instructors

REPRESENTATIVE EXPERIENCE

Ms. Mancini is the Task Leader of the Natural Resources Group in URS Greiner Woodward Clyde's Philadelphia office. She is also a Practice Leader on URSGWC's Natural Resource Damage Assessment Steering Committee.

Ms. Mancini has served as research and report coordinator, environmental task leader and project manager for a variety of environmental studies, including regional and site-specific inventories of natural resources, hazardous and non-hazardous site evaluations and assessments, and site selection studies associated with landfills and other commercial and industrial uses. Areas of study span the continental U.S. and Alaska.

Ms. Mancini has provided technical expertise and served as task leader on numerous ecological risk assessments, and is familiar with the most current EPA Superfund and RCRA guidance. She has served as ecological task leader on several comprehensive RI/FS investigations. She has prepared detailed Ecological Data Collection Plans for a wide variety of sites with complex ecosystems. She has also contributed ecological expertise in the preparation of Feasibility Studies, Alternatives Analyses and Ecological Monitoring Plans.

Ms. Mancini's specialized area of expertise is benthic ecology. She has designed and conducted benthic investigations in freshwater, estuarine and marine ecosystems throughout the United States. Many of these investigations have focused on the use of benthic macroinvertebrates in the assessment of ecological impacts associated with hazardous waste sites.

Examples of Ms. Mancini's project-related experience are summarized below.

Environmental Assessment Experience:

- Preparation of an Environmental Assessment Report for a proposed industrial waste landfill in Delaware City, Delaware.
- Baseline inventory and impact assessment associated with roadway improvements along the Garden State Parkway.
- Baseline inventory and management recommendations for environmental resources at the Eleanor Roosevelt National

TRAINING

Hazardous Waste Training
(OSHA CFR 29:1910:120)

Basic Wetland Delineation
Training Course

URS Greiner Woodward
Clyde Ecological Risk
Assessment Workshop

AFFILIATIONS

North American
Benthological Society

Association of New Jersey
Environmental
Commissions

Historic site in Hyde Park, New York.

- Baseline inventory and management recommendations for environmental resources at the Willowbrook Developmental Center in Staten Island, New York.
- Baseline inventory and impact assessment for the Manasquan Reservoir System in Monmouth and Ocean Counties, New Jersey.
- Environmental assessment of the effects of a zinc smelter plant in Palmerton, Pennsylvania.
- Environmental assessment of the siting of regional wastewater treatment facilities in Cape May and Camden Counties, New Jersey.

Site Selection Experience:

- Critical review of site selection methodology and supporting documentation for a landfill site selection study performed in central New Jersey.
- County-wide site selection study for an interim/residue landfill site in Somerset County, New Jersey.
- Regional wastewater treatment facilities in Cape May and Camden Counties, New Jersey.
- County-wide sanitary landfill, transfer station and composting facilities in Cape May County, New Jersey.
- Potential sites for land application of wastewater effluent in Camden County, New Jersey.
- Summit General Mail Facility in Morris County, New Jersey.

Ecological Risk Assessment Experience:

- Acting peer reviewer for several comprehensive ecological investigations at SUPERFUND sites in Oregon and Washington
- Co-Investigator for an ecological risk assessment performed for a former sewage treatment facility on the

Sammimish River in Redmond, Washington.

- Principle investigator for an ecological risk assessment being performed as part of the remedial investigation of a wood treatment site in Renton, Washington.
- Task leader for ecological risk assessment at a chromium etching facility on a US Army installation near Shreveport, LA.
- Task leader for ecological risk assessment of a former army hospital in Pennsylvania.
- Scoping and peer reviewer of aquatic ecological risk assessment of a CERCLA site near Denver, Colorado.
- Task leader for New York State Fish and Wildlife Impact Assessment performed at an industrial site in Blauvelt, New York.
- Ecological Risk Assessment of a United States Army Toxic and Hazardous Materials Agency (USATHAMA) site, targeted for closure and sale, in Annandale, Virginia.
- Ecological Risk Assessment of a pigment plant located in Delaware; CERCLA site.
- Preliminary Endangerment Assessment and Aquatic Environmental Assessment in the vicinity of a former pesticide plant in central New Jersey.
- Endangerment assessment for abandoned auto salvage landfill site in Pensacola, Florida.
- Assessment of impacts to the aquatic fauna in the vicinity of a former waste dump in Port Arthur, Texas.

RI/FS Experience:

- Preparation of portions of a work plan dealing with ecological sampling at a former wood-treating facility in Delaware; CERCLA site.
- Preparation of Ecological Data Collection Plan involving sampling of fish, benthos, sediment and aquatic macrophytes, and subsequent evaluation of data at the site of an aluminum reduction plant in New York; CERCLA

site.

- Endangerment assessment for a coal tar site in Long Branch, New Jersey.
- Endangerment assessment for a former industrial landfill in Niagara Falls, New York.
- Endangerment assessment for abandoned auto salvage landfill site in Pensacola, Florida.
- Evaluation and hazard ranking using the USEPA Hazard Ranking System of 40 waste sites in New York State (NYDEC Regions 1, 2, and 3).
- Risk assessment study for a major hazardous waste transfer and incineration facility on the Atlantic Coast.
- Assessment of impacts to the aquatic fauna in the vicinity of a train derailment release of perchloroethylene in Livingston, Louisiana.
- Assessment of impacts to the aquatic fauna in the vicinity of a former waste dump in Port Arthur, Texas.

Aquatic Ecological Experience:

- Benthic macroinvertebrate community survey in Eastchester Bay, New York.
- Benthic survey and impact assessment of an unnamed stream in Blauvelt, NY.
- Impact assessment for ocean dumping in the New York Bight Apex.
- Ecosystem evaluations for Sandy Hook Bay, Raritan Bay, New York Bay, and Long Island Sound.
- Impact assessment for Suffolk County Stream Flow Augmentation Study in Long Island, New York.
- Ecological studies to support an EIS for I-95 roadway improvements in Bucks County, Pennsylvania.

- Impact evaluation of causeway construction on migration of larval fish in Prudhoe Bay, Alaska.
- Impact evaluation of flood control measures on Halls and Green Bayous in Harris County, Texas.
- Determination of the historical mean high water mark on a natural lake in Polk County, Florida.
- Baseline inventory and assessment of aquatic impacts due to the filling of a portion of the East River below FDR Drive in Manhattan.
- Baseline inventory and impact assessment due to ocean disposal of wastewater effluent in Cape May County, New Jersey.
- Assessment of aquatic impacts due to phosphate mining in Pamlico Bay, North Carolina.
- Baseline inventory of aquatic ecosystems in the vicinity of a proposed copper mine in Aroostook County, Maine.

Wetlands Investigations:

- Evaluation of wetlands which developed as a result of remediation of a landfill in Lehigh County, PA; CERCLA site.
- Determination of the potential for wetlands to exist at an abandoned herbicide site in Elkton, Maryland.
- Preliminary reconnaissance for the purpose of identifying wetlands on a former ash residue disposal site along the Delaware River in Holland Township, New Jersey.
- Preparation and submittal of an NJDEP Wetlands and Stream Encroachment Permit package for the remediation of contaminated ditches at an abandoned pesticide manufacturing facility in Middlesex, New Jersey.
- Verification of wetland boundary lines for a proposed ash residue landfill site in central New Jersey.
- Determination of the potential for wetlands to exist on the site of a proposed regional mall in Harrisburg,

Pennsylvania.

- Verification of wetland boundary lines for a commercial tract on the Arthur Kill in Perth Amboy, New Jersey.
- Investigations associated with permit acquisition for filling in freshwater wetlands at a 250-acre site in Wilmington, Delaware.

**AREAS OF
EXPERTISE**

- computer support/
application
development
- chemistry
- environmental science
- chemical engineering

EDUCATION

New Jersey Institute of
Technology, M.S.,
Chemistry, 1997

New Jersey Institute of
Technology, M.S.,
Environmental Science,
1992

New Jersey Institute of
Technology, B.S.,
Chemical Engineering,
1984

**PROFESSIONAL
HISTORY**

URS Greiner Woodward
Clyde, Staff Scientist to
Assistant Project
Scientist/Engineer, 1988 to
present

New Jersey Institute of
Technology, Chemistry
Instructor, 1986-1988

REPRESENTATIVE EXPERIENCE

Mr. Cebula provided computer desktop support, software application development and user maintenance support for Wayne office personnel.

- Developed computer interfaces for various environmental applications including air monitoring and data management.
- Desktop support included PC repair, PC hardware and software upgrades and hardware and software troubleshooting.
- Network support included adding Windows NT® workstations to network domain, adding user accounts and connecting PC's to various network services and applications.

Mr. Cebula was a resident engineer for a large soil remediation project for the West Company. Provided various construction site services to the West Company for the remediation of 2,500 tons of soil from the former manufacturing facility in Millville, New Jersey.

- Performed oversight and inspection of contractors work including site clearing, soil erosion controls, excavations, decontamination controls, soil backfilling, compaction testing, air monitoring and site closure.
- Performed post excavation sampling and delineated site contaminants based on sampling results.
- Implemented a site Health and Safety Plan as the Site Safety Officer.

Mr. Cebula was a resident engineer for a large soil remediation project for M.I. Holdings, Inc., a subsidiary of Avon Products, Inc. Provided construction oversight services to M.I. Holdings, Inc. for a remediation project to excavate 15,000 tons of soil from the site of a former 11 acre chemical plant located in Jersey City, New Jersey.

TRAINING

Site Planner Training, 1992

Entec Training, 1992

Hazardous Materials Health
and Safety Training, 40
hours, 1994

Red Cross Basic First Aid
Training, 1992

AFFILIATIONS

American Institute of
Chemical Engineers

American Chemical
Society

- Assisted the client in transportation and disposal or recycling of excavated soils to recycling facilities in Maryland and hazardous waste disposal facilities in Ohio and Michigan.
- Performed extensive post excavation sampling activities and coordinated analytical laboratory data for regulatory compliance. In addition, conducted daily meetings to determine the Contractor's excavation sequencing.
- Assisted in the development of plans and specifications for the Contractor.
- Implemented a Site Health and Safety Plan.

Mr. Cebula has experience with various Oracle® based data management systems including Environmental Compliance Management System (ECMS - Versar, Inc.), Environmental Data Station (EDS - Automated Compliance Systems, Inc.) and Site Manager (Consolve, Inc./URSGWC).

- Management and tracking of coordinate data and chemical data for a groundwater remediation project using a database management application (Site Manager).

Mr. Cebula has successfully applied graphical software such as Entec (Surpac Software International Pty Ltd) and Site Planner (Consolve, Inc.) to help analyze and visualize site conditions. Some representative projects are highlighted below.

- Investigation to evaluate metal concentration distributions in soils for on-site and off-site comparison at a chemical manufacturing facility.
- Evaluation of organic contaminants in soil media as part of a large RCRA Facility Investigation (RFI).
- Evaluation of volatile and semi-volatile organics at a former Manufactured Gas Plant (MGP).

Mr. Cebula has completed several lab data validation projects at URSGWC. Developed mathematical models to the calculation of air emissions for permitting by the State of New Jersey.

He has performed site safety monitoring and field sampling at the Essex County Resource Recovery Facility and has prepared NJPDES discharge monitoring reports as part of the permitting requirements for the facility.

He has used chemical diffusion models to estimate emissions as part of EPA's requirements for toxic release inventories (SARA Title III, Section 313, Right-To-Know compliance).

At the New Jersey Institute of Technology, Mr. Cebula carried out research on Polycyclic Aromatic Hydrocarbons (PAHs). Samples were obtained from various incineration sources and analyzed by High Performance Liquid Chromatography (HPLC). PAH profiles were examined to relate operation factors to emission profiles.

AREAS OF EXPERTISE

- design engineering
- feasibility studies
- remediation

EDUCATION

Boston University,
M.B.A., 1996

Northeastern University,
M.S., Environmental
Engineering, 1983

University of Washington,
B.S., Fisheries Science,
1976

Tufts University, B.S.,
Civil Engineering, 1970

REGISTRATION

Professional Engineer,
New York, Connecticut,
Massachusetts, Georgia,
Rhode Island

PROFESSIONAL ORGANIZATIONS

Water Environment
Federation
New England Water
Environment Association
Instrument Society of
America
American Society of Civil
Engineers

REPRESENTATIVE EXPERIENCE

Mr. Coffey has more than twenty-five years of experience in project management and has filled the roles of Chief Engineer and Department Manager for process and design engineering for more than five years. He is a Civil/Environmental Engineer with an unusually comprehensive background which encompasses both the traditional, and more current, technologies for treatment and disposal of conventional, and hazardous wastes, respectively. Experience includes feasibility studies, and planning, design, construction management and construction inspection of municipal, industrial and private wastewater collection and treatment systems, water systems, sanitary landfills, hazardous waste remediation and storage facilities, and coastal zone management programs.

Mr. Coffey has a working knowledge of RCRA, CERCLA, TSCA, TURA and other regulatory requirements. He has performed sampling and analysis of wastewater treatment plants and made recommendations for operational changes; he has evaluated the effects of toxic substances in the environment. His experience includes sampling and analysis of lake, stream, estuarine and marine waters, identification of aquatic life and the studies of the effects on aquatic life of chemical and thermal pollution, and radioactive inputs.

- **Pine Street Barge Canal Site, Burlington, VT:** As Design Manager, performed a study and evaluation of alternatives to replace the EPA ROD alternative for remediation of coal tar contamination from a former manufactured gas plant at the Pine Street Barge Canal Site located on Lake Champlain. Working for the PRPs, he developed an acceptable alternative to excavation and landfilling (the ROD selected alternative). The alternative developed called for leaving the coal tars in place, isolating the contaminated area with driven sheet piles and an impermeable cap, and placing clean substrate over the cap to support growth of aqueous plants and benthic organisms.

- **Confidential Industrial Client, MA:** As Design Manager, directed a study to determine the effectiveness of heat injection into soils in improving the flowability of highly viscous oils (aromatic hydrocarbons) contaminated with halogens. The study looked at the decreased viscosity and improved flowability (extractability) of the oils brought about by raising the temperature of the oils through heat injection into the soil. Evaluation of different methods of heat injection for cost-effectiveness was included.
- **RayMark Facility Superfund Site, Stratford, CT:** As Design Lead, coordinated a multi-disciplinary team of civil, structural, mechanical, instrumentation, and electrical engineers for the design of a gas control and treatment system for a 30-acre site at a former asbestos brake manufacturing facility. Treatment of the off-gases will consist of both granular activated carbon systems, and thermal oxidation systems.
- **U.S. Coast Guard - Floyd Bennett Field, Brooklyn, NY:** As Design Lead, was responsible for coordinating a team of civil, structural, mechanical, instrumentation, and electrical engineers for the design of a large soil bioventing and off-gas treatment facility for soils contaminated with jet fuel at the Coast Guard Air Station.
- **Souza's Texaco, East Falmouth, MA:** As Design Lead, coordinated the design team for the design of the groundwater sparging and soil vapor extraction system in the vicinity of the former Souza's Texaco gas station. This design work included the use of activated carbon for treatment of the off-gas. This work was performed for the Massachusetts Department of Environmental Protection.
- **Olin Chemical Company, Lancaster, PA:** As Design Lead, coordinated a design team of civil, structural, mechanical, and electrical and instrumentation engineers in the design of a 120-gpm groundwater extraction and treatment system for treatment of groundwater

contaminated with chlorinated solvents at the former Hamilton Watch factory. This system utilizes air stripping and granular activated carbon for treatment of the off-gas, and includes a force main for discharge of the treated effluent to the City of Lancaster sewer system. A remote sensor is included in the design to monitor water level in the downstream sections of the sewer system. The sensor signals for the groundwater extraction and treatment system to shut down when water levels in the sewer system exceed system capacity because of a storm event.

- **CE Cast, Muse, PA:** As Design Lead, worked with a staff civil engineer on the design of a soil excavation and thermal desorption project for the former foundry owned by CE Cast. Documents prepared included drawings and specifications for the soil removal, treatment by thermal desorption, and site restoration using treated decontaminated soil to backfill the excavated areas. An erosion control plan prepared in conformance with PADER requirements was a part of the design effort. This project received the Grand Conceptor Award for its innovative and cost-effective solution to on-site contamination.
- **MCLB, Albany, GA:** Provided advice and review of design services for several remediation activities conducted at the Marine Corps Logistics Base. These designs include groundwater extraction and treatment systems for removal of contaminated solvents, as well as soils removal and remediation actions. All engineering actions were prepared in conformance with Naval Facilities Engineering Command requirements for preparation of engineering drawings and specifications.
- **Kent-Taylor, Rochester, NY:** Provided advice and review of design documents associated with the demolition of a large instrument manufacturing facility. This former manufacturing facility consisted of a large complex of buildings totaling several hundred thousand square feet in area, containing numerous sites within the building complex which are contaminated with elemental

mercury, cyanide, and other toxic chemicals on an occasional basis. The design work consisted of several floor plans showing the nature of the building's construction (this was a multi-level facility), and the locations and kinds of contamination within the structures. Specifications were prepared detailing how the demolition was to address the removal and disposal of the several different types of demolition debris, taking into account the nature of the materials, and the kinds and concentrations of the contaminants. Bid review assistance is also a part of the work.

- **Confidential Client, Bangor, ME:** As Design Manager, was responsible for the design of remediation plans and specifications for an area of soils contaminated with chlorinated solvents at Building 10 in the industrial park at the Bangor International Airport. This area is immediately adjacent to the Maine Air National Guard hangers. Remediation consisted of excavation of contaminated soils and landfarming on an area specially designed for the bioremediation of contaminants found in the soil. The bioremediation project was determined to have been successfully completed to the satisfaction of the MEDEP. The bioremediation platform was also designed to function as a parking area once bioremediation of the contaminated soils was completed.
- **Confidential Client, MA:** As Project Manager, was responsible for overseeing the design of PCB decontamination, and subsequent rehabilitation of an operating manufacturing facility for heavy industrial use. Drawings and specifications detailing the cleaning operations, and subsequent demolition and construction work were prepared and put out to bid. The design approach minimized costs while allowing continued use of the building.
- **Confidential Client, MA:** As Project Manager, was responsible for a treatability study and design of an activated carbon-activated sludge industrial wastewater treatment plant for treatment and removal of diethylhexylphthalate at a plastics manufacturing facility. The plant was designed to meet OCPSF standards.

- **Confidential Client, MA:** As Project Manager, was responsible for turnkey services (associated design, procurement and construction) for a groundwater recovery and treatment system, and for a separate phase product recovery system at an operating aerospace manufacturing facility.
- **New England Telephone Co., MA; VT; NH:** As Chief Engineer, provided technical oversight for removal and replacement of over 40 underground storage tanks for gasoline, diesel and heating fuels.
- **Confidential Client, MA:** As Project Manager, was responsible for overseeing study/design/construction services for oil/water separation facilities and outfall reconstruction of over ten storm drain outfalls servicing a large manufacturing facility. Complete hydraulic analysis and NPDES permitting of outfalls was part of the work. Project had a \$6 million construction value.
- **Confidential Client, MA:** As Project Manager, was responsible for overseeing design of a treatment/remediation facility for TCA-contaminated groundwater at a large manufacturing facility. An air stripping column followed by vapor phase carbon was utilized to remove contaminants.
- **Confidential Client, MA:** As Project Manager, was responsible for overseeing design/construction services for a large treatment/remediation facility for jet fuel contaminated groundwater at a large manufacturing facility. A tray aeration system followed by a thermal catalytic destructor was used to remove the contaminant. The entire system was mounted in an enclosed trailer for mobility.
- **Confidential Client, MA:** As Project Manager, was responsible for technical oversight of a feasibility study for treatment and disposal of contaminated soils at a large operating industrial manufacturing facility (over 200 acres) with an operating history of over one hundred

years. High temperature and low temperature thermal, and non-thermal technologies were evaluated, and recommendations were made, contingent on the kind of hazardous waste contamination involved.

- **Rhode Island Solid Waste Management Corporation, Central Landfill, Johnston, RI:** As Project Manager, was responsible for design of a subsurface methane gas migration control facility, water distribution and metering facilities, and access roadways and scale facilities at the Central Landfill in Johnston, RI. He was also Project Manager during the construction and start-up of these facilities.
- **Massachusetts Department of Environmental Protection, Middleborough, MA:** As Project Manager, was responsible for overseeing design and construction of a treatment/remediation facility for contaminated groundwater at a former gasoline service station site. The fully automated system utilizes activated carbon.
- **Sewer District No. 1, Rockland County, NY:** As Project Manager for Design/Construction Services for Rockland County, New York Sewer District No. 1, supervised a multi-disciplinary team of civil, structural, electrical, mechanical and instrumentation engineers for a \$140 million expansion of wastewater treatment facility. His responsibilities included interfacing with client and numerous contractors on a multi-prime series of contracts.
- **Humphrey Chemical Co., North Haven, CT:** As Project Manager, was responsible for design of an industrial waste neutralization facility and a hazardous waste drum storage facility.
- **Hamm's Sanitary Landfill, Lafayette, NJ:** As Construction Superintendent, was responsible for construction of one-mile bentonite slurry cutoff wall and berm for containment of landfill leachate.

- **Federal Bureau of Prisons, Otisville, NY:** As Project Manager, was responsible for design and construction management for a sewage treatment plant rehabilitation and expansion at the Federal Correctional Institution, Otisville, NY. The expanded facility is now on-line and producing a high quality effluent.
- **Town of Bristol, RI:** As Project Engineer, was in charge of design for upgrading an existing primary treatment plant to provide secondary treatment of sewage. The work included complete hydraulic analysis and aspects of mechanical and civil design for a 4-MGD wastewater plant.
- **Metropolitan District Commission, Boston, MA:** Project Engineer on the design of a comprehensive computerized flow monitoring system to wholesale water to more than a score of cities and towns on the Metropolitan District Commission's service area around Boston, MA.
- **Town of South Berwick, ME:** As Project Engineer, was in charge of hydraulic analysis of an existing water system. The work included field monitoring of flows, computer analysis of the existing system, and recommendations for improvements, as well as projected construction cost estimates.
- **Penobscot Bay Medical Center, Rockland, ME:** As Project Engineer, performed the design for the 10,000-gallons-per-day extended aeration wastewater treatment facility serving the Penobscot Bay Medical Center complex.
- **Atlantic County, New Jersey, MUA-Municipal Solid Waste Transfer Station:** Served as design reviewer for a major municipal solid waste transfer station design for the Atlantic County, New Jersey Municipal Utilities Authority. Performed a thorough review of drawings and specifications produced by the design team to ensure their adequacy, compatibility, and completeness.

- **Bucks County, Pennsylvania, MUA-Municipal Solid Waste Transfer Station:** Performed layout and traffic flow design for a major solid waste transfer station in Bensalem, Pennsylvania servicing the Philadelphia metropolitan area.
- **RayMark Facility Landfill-Gas Capture and Control System Design:** As Design Lead, coordinated a multidisciplinary team of civil, structural, mechanical, instrumentation, and electrical engineers for the design of a gas capture, control, and treatment system for a 30-acre landfill site located in Stratford, Connecticut.
- **Town of Scituate, Massachusetts-Quality and Quantification Study of Municipal Solid Waste:** Performed sampling and weighing of municipal solid waste delivered to the Town of Scituate's municipal sanitary landfill. Information was analyzed and used in the design of the expansion of the landfill.
- **Town of Scituate, Massachusetts-Design of Landfill Expansion:** Designed landfill expansion utilizing information collected from study of quality and quantity of municipal solid waste delivered to the landfill.
- **Holt Road Landfill, Town of North Andover, Massachusetts- Design of Gas Migration Control System:** Performed site investigations and design of a gas migration cut-off trench at the Holt Road Sanitary Landfill.
- **Al Turi Landfill, Goshen, New York-Study and Process Design of Landfill Leachate Treatment System:** Studied and evaluated several treatment alternatives and participated in pilot plant operation and design of the leachate treatment facility for leachate generated at a municipal solid waste landfill located in Goshen, New York.

- **Mountaintop Municipal Solid Waste Landfill, Pennsylvania-Design of Leachate Collection and Treatment Facility:** Coordinated the design team for the leachate collection and treatment facility for the Mountaintop Municipal Solid Waste Landfill, Pennsylvania.
- **Milford RESCO Facility, Milford, Massachusetts-Design of Facility Access Ramp:** Designed the highway access ramp from State Route 20 to the Milford Resco Facility. Design was accomplished in conformance with State of Massachusetts Department of Transportation requirements.

PUBLICATIONS

Coffey, Brendan J., "Review of Recent Literature on the Heat Transfer and Combustion Efficiency Characteristics of the Pulse Combustion Engine, Particularly Relating to Atomization and Spray Drying, and Potential for Use in Destruction of Polychlorinated Biphenyls," presented to Northeastern University, Department of Civil Engineering, 1983.